ACCS

See Page 19

MODERN TRANSPORT

"THE TIMES" OF THE TRANSPORT WORLD

B.R. ELECTRIFICATION CONFERENCE OPENS

See Page 3

VOL. LXXXIV No. 2160 [*Registered at the G.P.O. as a newspaper*] LONDON, OCTOBER 8, 1960 PRICE ONE SHILLING

CURRENT TOPICS

The Threatened Railway Strike

THE decision of the National Union of Railwaymen to call an all-out strike in support of the claims of the shopmen is, to say the least, surprising; it is indeed flagrantly irresponsible and it seems to have astonished the other body concerned—the Confederation of Shipbuilding and Engineering Unions. A stoppage would be disastrous to the railways at a time when their customers are showing a readiness to revive long-lost good will. For years traders have been the victims of delays and uncertainty of service on a run-down railway system, and ever in the background has been a sometimes rebellious and discontented staff. It was assumed that these troubles were now pretty well over and perhaps finally exorcised by implementation of the Guillebaud Committee's report. A new atmosphere seemed to have been created, with a feeling that at length there was to be widespread effort by both management and men to provide service at a price and at a measure of reliability which would effectively compete with road transport. Such hopes have been blasted. Despite doubts whether the Guillebaud recommendations were intended to embrace the 110,000 railway shopmen the Commission has gone far towards applying them. In fact, railway shop wages were not investigated by the Guillebaud Committee; nevertheless the shopmen, like other railway workers, were given an increase of 5 per cent from January 11 and later were offered a further 3 per cent, to be paid from the same date. Although the N.U.R. was anxious to establish the principle that railway shopmen should be treated as other railway workers, it and the other unions concerned seemed prepared to accept the 3 per cent increase for unskilled men but wanted more for the skilled and semi-skilled grades. The difference between Commission and unions now boils down to 4s. 6d. a week for 45,000 skilled men.

What Railways Need

THERE may be sympathy with the claimants in that the negotiations have dragged on for three months or so while all other railway workers, including dock and catering grades, have been paid substantial increases under the Guillebaud arrangement. But this does not justify action which, as Sir Brian Robertson has pointed out in a letter to the unions, will do irreparable damage to the industry. He does not agree that no other course is open because the constitutional machinery has not yet been exhausted. For his part Mr. S. Greene, general secretary of the N.U.R., in pointing to the reluctance of his executive to take strike action, states that the trouble has been caused by the long delay in negotiations. He admits that it is an unfortunate time to have a railway strike, when freight and passenger traffic are increasing and any disturbance may have serious effects on the industry and the public. He would dearly have liked to have settled the dispute without a strike, and it could have been done, he says, if the Commission had been prepared to raise the skilled shopman's rate to £10 5s. a week. He has no quarrel with Sir Brian, other than in the fact that the latter has not the money to pay the claim. It would seem, therefore, that the N.U.R. has taken extreme action in order to bring pressure on the Government irrespective of public loss and inconvenience and regardless of their own interests. The fact remains that, despite the inability of the railway industry to back the Guillebaud recommendations, railwaymen in general have already received full benefit from them. The public purse, however, is not bottomless and future pay rises must depend upon the men's own efforts to get the railways on to an even keel. In the long term they must lose from a strike much more than they will lose in the short term. What the railway industry needs today on the employees' side are leadership, loyalty, imaginativeness and resolution. In the absence of these qualities whatever the management may accomplish in the field of modernisation will be of little avail.

Another Dubious Example

AIRLINES using British airports could hardly be blamed for feeling that troubles never come singly. Following closely upon indications that not only might there be an airport passenger charge for internal services but that the international charge might be raised, and the ineffable behaviour of the Board of Trade regarding completion of forms by passengers to which we referred last week, came the announcement that the Ministry of Aviation was proposing to increase landing fees by a third from next April. It was stated by the Minister that this should reduce the deficit arising from the provision of airports and their facilities and that could well be the case, but the operators can well ask why such an increase is necessary when British landing fees are already a byword throughout the world because of their high level. If the facilities they offered were so much better than those elsewhere it might be that the imposition would be accepted, although naturally with reluctance, but it is difficult to agree that this is the case. There has been little official eagerness, for example, to provide Fido and airports would undoubtedly boggle at the prospect of even half the amount of private traffic which uses, for example, Midway Airport, Chicago. Imposition of such heavy charges is bound to defer the introduction of cheaper fares with their consequent benefits, while foreign operators of transatlantic services might well find it advantageous to overfly Britain. That in its turn could do more harm to invisible exports through the tourist industry than could ever be offset by reducing the loss on airport operation. It is surely time that Britain ceased to do nothing but set doubtful examples in this field.

Fascinating Model Display

PART of the public relations work of railways all over the world is done for them by their innumerable admirers; among these the model makers and model operators must hold a very high place. Despite the claims of the motorway, air and space travel ages, more boys (of all ages) are succumbing to the attractions of the model railway. This is partly through the example of the Model Railway Club and the monthly exhortations of a number of lively "how-to-do-it" magazines, but it is also due to the increasing excellence of commercial modelling standards and the enterprise of the model engineering trade. That body's Model Railway Hobbies Show, held in Westminster last week, amply proved the high standards and vividly showed the variety of choice of ready-to-run or build-it-yourself models the follower of the hobby can now have. No longer is the enthusiast limited to a narrow range as in our youth; all sections of British Railways, many European systems and North American railways (even to Shay-geared engines on logging lines) were represented not only in locomotives and rolling stock but in buildings and lineside accessories. Neither are tramway and trolleybus systems neglected, nor even the L.M.S. Rorailer. The art of building a model railway layout is to make it scenically realistic and the visitor to Central Hall was certainly shown the way.

Workmanlike Enthusiasm

FOUNDED nearly four years ago, the Vintage Passenger Vehicle Society has followed its aim of preserving for the future buses in as near as possible the original condition in which they entered service prior to 1932. It is, moreover, the intention that all of them should be capable of operating on the road as efficiently as in their heyday. The society has, perhaps, been a little diffident in publicising its aims and there was a certain amount of hesitation regarding the first exhibition which was staged at Hatfield last month in case people came "expecting too much." In fact, the occasion was remarkably successful and it may be hoped that it was but the first of many such events. Planned to show the way in which the members work, the eight vehicles invited showed the various stages from bare cohesion to virtually complete overhaul and repainting in original livery. The past summer has unfortunately slowed down the work of members on their vehicles since they have necessarily to remain in most cases in the open; it should be added that the society is most anxious to find suitable accommodation not only to enhance the preservation of the vehicles, but also to increase the opportunities to work on them. There are, moreover, some operators who could be more helpful in providing information from their records and, we suspect, although the society is silent on the subject, others who could go further than that if they cared to appreciate that p.s.v. operation now depends more than ever on public goodwill. However that may be, those who are members of the V.P.V.S. displayed workmanlike enthusiasm.

Victoria Station Centenary

LAST Saturday the Railway and Canal Historical Society celebrated the centenary of the opening of London Victoria Station on Monday, October 1, 1860, by a visit to the station and the Central Section signalbox. Victoria is notable as having been built by a terminal company, the Victoria Station and Pimlico Railway, which acquired a waterworks site and the Grosvenor Canal basin so as to extend the West End of London and Crystal Palace line from its Pimlico terminus (on the site of the Battersea Wharf electric traction exhibition) to the north side of the Thames; incidentally it became the first railway crossing of the river in the London area. The owning company leased part of the site to the London, Brighton and South Coast Railway (which absorbed the W.E. of L. and C.P.) and part to the London, Chatham and Dover, with which company the Great Western shared facilities for many years—so much so that its name appeared on the stonework when a permanent building was put up on the Chatham side after 48 years. The Brighton company's trains began to enter Victoria on October 1, 1860, but it was December before the Chatham trains reached their goal and two years more passed before the permanent platforms and canopy were ready. Early this century the Brighton Station was extended southward to double the length of the platforms, as expansion sideways was too costly; trains call at the south station to set down, but pick-up from the north end, a middle road being provided for release of the previous train on the north of the platform. Platform extension is now taking place on the Chatham side in connection with electrification to the Kent Coast. The R.C.H.S. party last week had the benefit of a lecture from the well-known railway historian, Mr. Charles E. Lee.

LEADING FEATURES IN THIS ISSUE

	PAGE
Portrait	
Alderman Sidney P. Hill	11
Special Articles	
Towards a Traffic Balance in London	2
British Railways Electrification Conference: Interest in Exhibition ..	3
Points from the Conference Papers: Locomotives, Rolling Stock and Equipment	7
Rolling Liquid Containers in Service with U.S. Army	8
English Electric Locomotives for British Railways: 3,300 h.p. A.C. Units Weigh 73 tons	9
C.I.E. Plans Final Rail Network ..	11
Railway Strike Threat: N.U.R. Action	11
Present State of Railway Electrification: 6—Further Developments Abroad. By F. J. G. Haut	12
New Pullman Cars Inaugurated ..	15
Travolators at the Bank Station ..	17
Modern Airways Section	
S.A.A. Boeing Service Starts: Four Flights Weekly	13
New Manston Passenger Building ..	13
Regular Features	
Commercial Aviation	11
Financial Results	20
Forthcoming Events	14
Important Contracts	20
Letters to the Editor	8
Lorry, Bus and Coach News	4
News From All Quarters	10
News Summary	2
Road Vehicle Industry	5
Shipping and Shipbuilding ..	20
Social and Personal	19

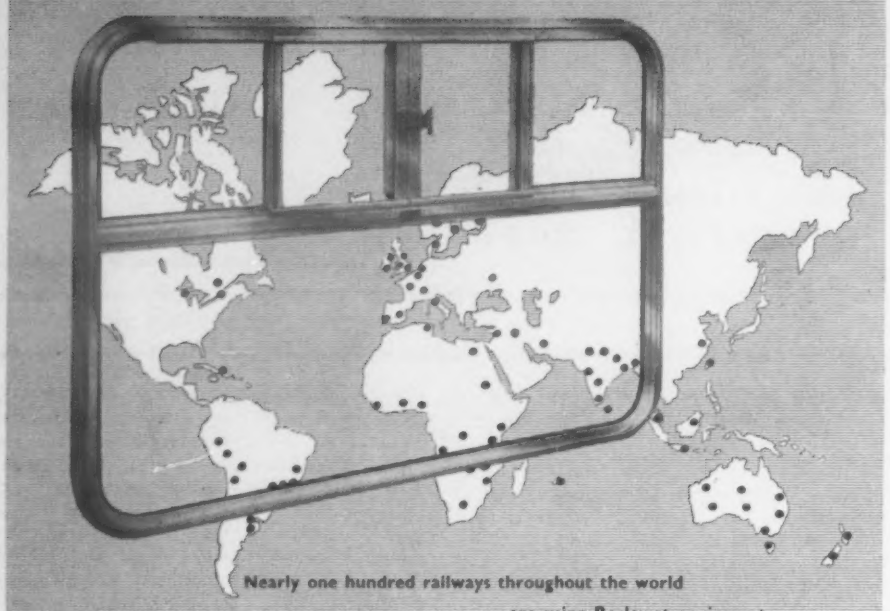
Excellent Report Presentation

PRESENTATION of an annual report in a vivid form is never an easy matter and particularly if it needs to conform to Government requirements. Sometimes an organisation will take courage and break away from tradition as British European Airways did so well some 10 years ago. It is less simple for a Government Department, but Brigadier C. A. Langley, Chief Inspecting Officer of Railways, has included in his annual report to the Minister of Transport for 1959 no fewer than eight graphs reviewing progress since the end of the 1939-45 war. He also shows how much chance is involved in accidents regardless of human participation. We shall return to the report (H.M. Stationery Office, price 5s.) in a subsequent issue but must record meanwhile that passenger carelessness shows no signs of diminishing and that while the most serious types of error by railway staff are fewer, there is an unfortunate increase in accidents caused by lesser failings. The improvement in the staff accident record for 1958 was not improved last year and Brigadier Langley calls for a vigorous safety campaign. The dangers involved on the newly electrified lines have already been the subject of special drives.

World Railways for Reference

YET another edition of that comprehensive reference book, *World Railways*, edited by Henry Sampson and published by Sampson Low, Marston and Co., Limited, at Potter Row, Great Missenden, Bucks (£5 5s.) has appeared. Our own files on world transport systems are necessarily comprehensive but the information presented between one pair of covers by *World Railways* is quite extraordinary for its range and detail. There are some 120 pages of tabulated data from gauges to finance, from rolling stock totals to weather conditions, dealing with a very large number of undertakings (nearly 700 in the U.S.A. alone); then in about twice the space further details are given of leading undertakings from motive power policy and modernisation plans to rail fastenings and signalling equipment, with illustrations of new locomotives and rolling stock and notes on selected manufacturing firms in the country concerned. Loading gauges and maps are among the useful information presented diagramatically. Useful appendices deal with underground railways and with diesel engine types for rail traction. This monumental compilation, of over 400 large pages, has made its mark and is now an accepted tool in the offices of railway undertakings and railway manufacturers; in addition it serves others outside the industry who want hard facts on railway enterprises.

BECLAWAT WINDOWS
and Sliding Door Equipment



Nearly one hundred railways throughout the world
are using Beclawat equipment

UNITED KINGDOM · AUSTRALIA · CANADA · THE BECLAWAT ORGANISATION · INDIA · SOUTH AFRICA · SWEDEN

BECKETT, LAYCOCK & WATKINSON LTD.
Acton Lane, London, N.W.10 and Caversham, Reading
ELLIOTT (WINDSCREENS) LTD., London, N.W.9
TENSATOR LTD., London, N.W.10

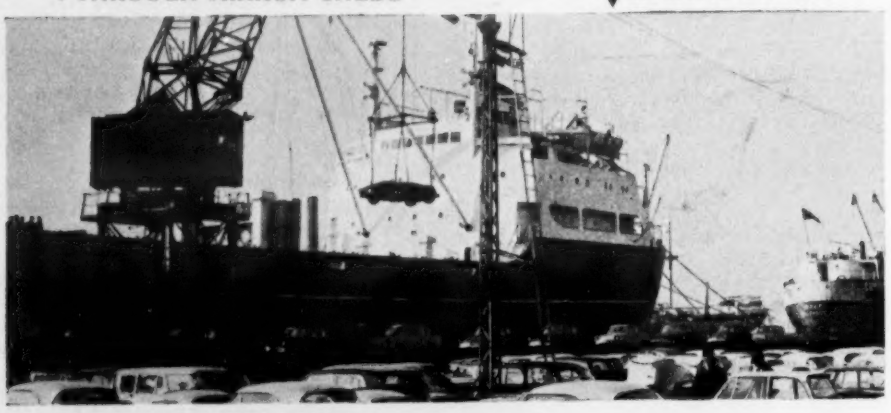
all cargo is speedily and
efficiently handled at the

NEWPORT | CARDIFF | BARRY
PORT TALBOT | SWANSEA

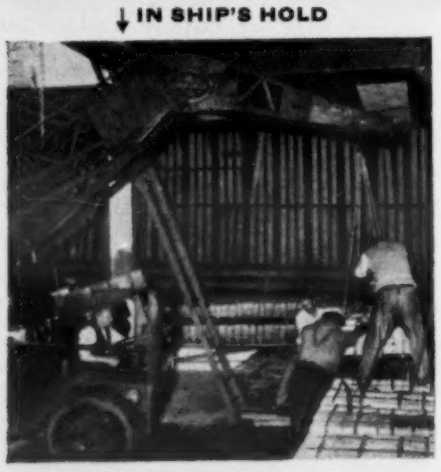
SOUTH WALES PORTS

↑ THROUGH TRANSIT SHEDS

↓ EX ROAD OR RAIL



↓ IN SHIP'S HOLD



INFORMATION:
W. Jeffers
Chief Docks Manager
South Wales Docks
Docks Office
Pierhead Building
Cardiff

BRITISH TRANSPORT DOCKS

MODERN TRANSPORT

Published Every Friday

RUSSELL COURT, 8-16 WOBURN PLACE,
LONDON, W.C.1

Telephone Number: TERminus 0303 (3 lines)
Telegraphic Address: Transpubco, Westcent, London

ANNUAL SUBSCRIPTIONS
BRITISH ISLES, 47/6; CANADA, 45/-;
ELSEWHERE ABROAD, 47/6
payable in advance and postage free

The Editor is prepared to considor contributions offered for publication in MODERN TRANSPORT, but intending contributors should first study the length and style of articles appearing in the paper and satisfy themselves that the topic with which they propose to deal is relevant to editorial requirements. In controversial subjects relating to all aspects of transport and traffic this newspaper offers a platform for independent comment and debate, its object being to encourage the provision of all forms of transport in the best interests of the community.

Towards a Traffic Balance in London

A STERNER and more forthright note has appeared in the annual report of the London and Home Counties Traffic Advisory Committee for 1959 where it discusses the place of the private car in the streets of the Metropolis. In the past, it says, the availability of the streets as a free garage has given undue economic encouragement to the use of cars by commuters as an alternative to public transport. Further encouragement of this trend could only lead to an overloading of the road system at peak periods, to the detriment of buses and other essential traffic, coupled with a drift away from public transport. This factor of peak-traffic turnout is one which, incidentally, is frequently overlooked in the point of view expressed by those who suggest that provision of controlled street parking and off-street parking space will substantially solve the congestion problem. It cannot if more and more traffic is decanted on to existing streets during the few short peak hours. We cannot afford to overlook the rapid growth in the use of the private car, the report goes on, or the need to make suitable provision for its use in the business and social life of the community, but it is important at the same time to recognise that the efficiency of London as a metropolitan centre must continue to rest upon the use of rail, tube, bus and taxi services, with their economic use of space, as the principal means of transport for commuters. What we lack are the criteria against which the relative claims of public and private transport may be weighed and perhaps be brought into balance. The appointment, announced this week, of an urban road planning adviser to the Ministry of Transport, with appropriately broad qualifications and experience, encourages the hope that planning of urban traffic requirements will in the not too distant future more nearly match the seemingly irresistible advance of our motor-car society. Study of the long-term development of roads and traffic and their influence on the urban environment is entailed; it is an opportunity to harness the experience, the resources and the vision of traffic engineers, architects and town planners in a way that just such a balance is achieved before the discomforts and the economic penalties of city life and work finally outweigh the benefits.

The Parking Meter Accepted

ARTIFICIAL encouragement to the replacement of any form of public transport by the widespread use of the car is therefore to be deplored. At the same time those who elect to make their daily journey into Central London by car should recognise that this is a practice for which they must pay at appropriate rates. That public opinion is more ready to accept this harsh fact is, in the view of the committee, evinced in the declining volume of objection to successive parking-meter schemes. Such objection as remains is substantially on matters of detail as affecting individuals or groups. The committee declares itself by no means complacent at the present scale of road improvement works. The current proposals by the London County Council for the further projection of its road development programme offer scant encouragement. The fundamental issue is that of urban motorways. The case for them in London is scarcely in doubt; such difference as exists is between those who are content with road improvements now and motorways later and those who urge advance on both fronts simultaneously. The Minister of Transport has just injected a depressing note into the discussion with his insistence that origin and destination surveys are an essential prerequisite to special-purpose roads into and out of London. If that is so there is not a moment to be wasted in getting the necessary field work in train.

Segregation of Traffic Flows

LAST year something like 13 or 14 private cars entered the Central London area during the morning rush hours for every 10 in 1957 (the number of motor cycles and scooters was up by no less than 75 per cent) and, as the Road Research Board has just reported, traffic nationally increased by nearly double the 1951-58 rate. It is evident from this that estimates of future traffic must be drastically revised, and it is impossible to exempt London from consideration. Despite the growing obstacles put in his way, it would be unrealistic and unjust to expect the car owner, especially if he is afflicted by positively uncomfortable rail journeys or frustrated by unreliable bus services (as is unfortunately so often the case at the present time), to reject permanently the idea of taking it up to town. It is inconceivable that if the present trend continues road improvement schemes can of themselves accommodate the rising tide of traffic, which is not to dispute the spectacular returns secured from such improvements. The point is that on present evidence they secure only short-run gains. Only the urban motorway, siphoning off traffic which has no use for the miles of suburban all-purpose roads, can make a lasting impact on the problem. The demise of the all-purpose radial road cannot be long delayed; relegated to the more mundane but still essential role of local and point-to-point service it can accommodate both public transport and delivery vehicles, of which it might be suggested alike that their function is to halt no less than to travel.

Success of Traffic Wardens

UNLESS or until there is some spectacular replanning of the central core of London—a prospect which seems no nearer realisation despite the visionary labours of young and promising architects—urban motorways must stop short at its perimeter. With or without them, however, there is now solid ground for belief that the West End arteries can be kept clear for public transport and essential traffic of other classes and that the by-ways, relieved at long last of their paralysis by congestion, may function as private car and local traffic routes. What has brought this once illusory prospect to realisation is the introduction of on-the-spot tickets for parking offences in the Mayfair meter zone. A few weeks ago we had some acid comment to offer on British traffic law enforcement. Since then the Mayfair plan has happily confirmed the view that secondary thoroughfares can carry out the role which was originally assigned to them in controlled parking schemes. Illegal parking has dwindled to infinitesimal proportions and the capacity of some streets has doubled. But vacant parking bays are so scarce as to raise the question whether adequate provision has been made for even the short-term parker. While, as the committee says, there is still an element of experiment in meter schemes and associated traffic regulations, the last three weeks in Mayfair have demonstrated beyond reasonable doubt that they can achieve the desired ends. There is really no longer any valid excuse for delay in extending both parking meters and traffic wardens throughout the area which was the subject of the Samuels Committee report in 1956.

NEWS SUMMARY

ORDERS have been placed with the Birmingham Railway Carriage and Wagon Co., Limited, and the British Railways works at Derby for 619 tube cars to complete rolling stock modernisation of the London Transport Central and Piccadilly Lines. (See page 20.)

South African Airways has replaced the piston-engined aircraft on its Johannesburg—London service with Boeing 707s. (Page 13.)

Sir Brian Robertson, chairman of the B.T.C., has agreed to further discussions with the trade unions concerned regarding wage increases for railway shopmen. The union executive agreed last week to call a strike for October 17 owing to dissatisfaction with the B.T.C. offer. (Page 11.)

Coras Iompair Eireann has announced what are intended to be its final railway closures. The remainder of the system will be maintained as a basic network. (Page 11.)

Evidence given before the Select Committee on Nationalised Industries when it inquired into British Railways has now been published. The report of the Committee appeared in July and was summarised in our issue of July 30.

BRITISH RAILWAYS ELECTRIFICATION CONFERENCE

Off to a Good Start

GREAT INTEREST IN EXHIBITION

The silver emblem shows up strikingly on the side of an electric locomotive

ON Monday the British Railways Electrification Conference got off to a good start.

In opening it Sir Brian Robertson, chairman of the British Transport Commission, said: "We British like to give the impression that we are a modest race and to pretend that it is rather vulgar to advertise oneself. Other people sometimes say that this is a sure proof of our self-conceit. The intention of this conference is to show everybody that we have got something which, we think, will interest them and that we want to display it and to discuss it with you. Over 40 different railway administrations are represented here in this hall. I find that particularly pleasing and I welcome you all most warmly on behalf not only of the British Transport Commission, but of two great trade associations—the British Electrical and Allied Manufacturers Association and the Locomotive and Allied Manufacturers Association—who share with us the responsibility for this Conference. We thank the Institution of Civil Engineers for placing this fine building at our disposal.

"For British Railways, and for the great railway engineering and manufacturing industry in Britain, this Electrification Conference is a great event. I believe that it will be a landmark in our railway history. That history goes back a long way. Railways began here. We are proud of that. However, we are not so proud of our past as not to be actually aware of the importance of the present and future. Railways are now faced with fierce competition from other forms of transport. To meet this competition they must arm themselves with the most efficient and economically effective weapons that modern science can devise.

Diesel and Electric

"On all modern railways now steam is giving way rapidly to diesel traction and electrification. Of these two neither can be said to be better than the other. Some conditions favour the one, other conditions constitute a case for the other. Given certain conditions, notably a line carrying consistently dense traffic, no other system of traction yet devised can combat competition so effectively as electrification with alternating current at high voltage and industrial frequency. In our case this means the 25,000-volt 50-cycle a.c. system. It is with our experience of this system, the technical problems involved and the progress we have been able to make, that we are concerned at this meeting of engineers from railway nations throughout the world.

"Ten years ago, my predecessor, Lord Hurcomb, then Sir Cyril Hurcomb, speaking in London to the Institution of Electrical Engineers' Convention on Electric Railway Traction, said: 'It is possible that if some of the railway companies had been so courageous and imaginative as to grasp the advantages of electrification, in spite of its high capital costs, they would have been better off.' Sir Cyril continued: 'All of us would most like to see a main-line electrification scheme from London right the way through to the point at which density of traffic begins to tail off. There is still no main-line electrification in this country in the full sense.

Change of System

"It was generally assumed at that time that we should continue with the 1,500-volt d.c. system which we had already used with good results and which indeed had been formally adopted as standard. In many ways it would have been highly convenient for us to go on with a system of which the technical problems had been solved and which I have first-hand knowledge of a good deal of what our friends of the S.N.C.F. have done, and I yield to nobody in my admiration for their achievements. In the Soviet Union, too, in Turkey, Portugal and latterly India, the system is making remarkable progress. The technical problems of installing the system change constantly as new techniques and materials are evolved, they also vary sharply from country to country. In Britain, the density of our railway network and the limitations of our loading gauge have created problems which have often required entirely novel solutions by the engineers."

In declaring the exhibition at Battersea open, Mr. Ernest Marples, Minister of Transport, referred to the essential role of railways in mass transport with the vivid illustration that to spread London comparably to Los Angeles, were it to rely entirely on the motor car, would occupy an area from Dieppe to Leeds. But railways had to be different in this age because of the motor vehicle; one essential was to modernise traction with diesel and electric power and that exhibition displayed some methods adopted by British Railways in conjunction with members of the Locomotive and Allied Manufacturers Association and the British Electrical and Allied Manufacturers Association—an example of nationalised industry and private enterprise working in co-operation. Later Mr. Marples received delegates at a Government reception at Lancaster House.

Two of the locomotives in the exhibition are seen in one of the bays at Battersea. Left, one of the Doncaster-built mixed-traffic third-rail d.c. locomotives with English Electric equipment for the Southern Region and, right, one of the B.R.-A.E.I. engines

World Interest

Britain's advanced techniques in the new a.c. system of railway electrification have attracted world-wide interest and over 450 delegates are attending the conference, including some 200 railway managers and engineers from abroad. Among them will be representatives from the United States and Russia, African, Asian and South American states, most European countries, and many countries and territories in the British Commonwealth and Empire. Delegates were taken to see electrification equipment and new a.c. electric trains on the Manchester—Crewe line of the London Midland Region, and they also saw something of electrification in progress or in operation in the Eastern Region, including the Colchester—Clacton—Walton line, which was the first in Great Britain to be electrified on the new British Railways standard 25,000-volt 50-cycle a.c. system.

Visits have also been arranged for individuals or parties of delegates to see railway equipment being made at the works of some of the manufacturers who are suppliers to British and overseas railways. These visits are supplementary to the exhibition of manufacturers' electrification equipment at Battersea arranged to run concurrently with the conference. There were also two evening film shows. Thus engineers and managers from overseas railway administrations have been able to study not only the technical progress made by British Railways as shown by electrification schemes completed and in hand, but also the advanced manufacturing techniques used by British firms in producing locomotives and electric traction equipment of every kind. In this way, the conference as a whole will present a summation of technical achievement on British Railways and a review of British engineering products for the rest of the world.

Work of Conference

The inaugural paper was by Mr. S. B. Warder, chief electrical engineer, B.T.C., entitled "Electrification in the Modernisation of British Railways: The Choice of the 50-cycle System." The working sessions of the conference began on Tuesday, October 4, when delegates began to discuss more than 40 technical papers prepared by leading experts of both British Railways and British manufacturers. In the morning, the subjects for discussion were the application of the 50-cycle system to railways, and electric locomotives; and, in the afternoon, electric multiple-unit trains, and power supplies for a.c. electrified railway systems. Presentation of technical papers was concluded on Thursday, October 6, when the delegates discussed overhead conductor line equipment and its erection, civil engineering, electric traction research, signalling and telecommunications. At the final session in the afternoon, there was a summing-up by Mr. R. C. Bond, technical adviser, B.T.C.

Mr. Warder began his paper by acknowledging that electrification can only be justified where traffic is heavy or frequent, owing to the cost of providing fixed installations. But it can create its own traffic, as with the Southern Region electric service. Over the years, however, scheme after scheme has been deferred because of war, lack of finance or the possibility of improving existing methods. What has not stopped, however, is technical development and this has led to the so-called "battle of the systems," which has to be resolved according to circumstances.

Advantages

In its simplest terms, the 50-cycle a.c. system is an association of the best features of a.c. systems with the best features of d.c. systems, i.e. the high-voltage and light fixed equipment associated with a particularly attractive power supply direct from the 132-kV national grid, and the rugged d.c. traction motor with its special ability for heavy and light duty and variable-speed operation. The inherent overload capacity of the system and tractors can absorb additional traffic without extra cost; on light traffic lines, or if traffic falls, the benefit of the lower expenditure on fixed equipment is realised. It is technically superior in all respects, and overall brings economies in capital and running costs by comparison with its d.c. counterpart.

Electrification offers a sure field for development provided the system is one that has world-wide application. This cannot be said for the 1,500-volt d.c. system, which is unlikely to be used in new schemes or be developed much further. The reverse can, however, undoubtedly be said for 25-kV 50-cycles a.c., as witness the spectacular results of the last five years in France, Turkey, Portugal, Russia, and now India. There is also the fantastic development in the use of semi-conductors as a means of rectifying a.c. current, as a switch and manifold other purposes which are only a beginning to what has been described as the electronic age. In short, the a.c. system is more flexible than d.c. and with changing requirements it has greater possibilities of development, of useful standardisation and of increasing economy.

Features Peculiar to Britain

Problems met in making it possible to bring a new system of electrification into use on 184 route miles comprising 535 single-track miles in 1960, followed by a further 134 route miles and 376 single-track miles in 1961, as a first instalment of the a.c. electrification schemes included in the B.R. modernisation plan were outlined. Suppression of interference to telecommunication circuits at the source by the use of booster transformers and return conductors, as one example, is assessed as costing roundly 5 per cent of the total cost of fixed equipment, when the full scheme with return conductors is used, taking into account the economy that is possible in the screening of railway signalling and telecommunication circuits by doing so.

Clearance

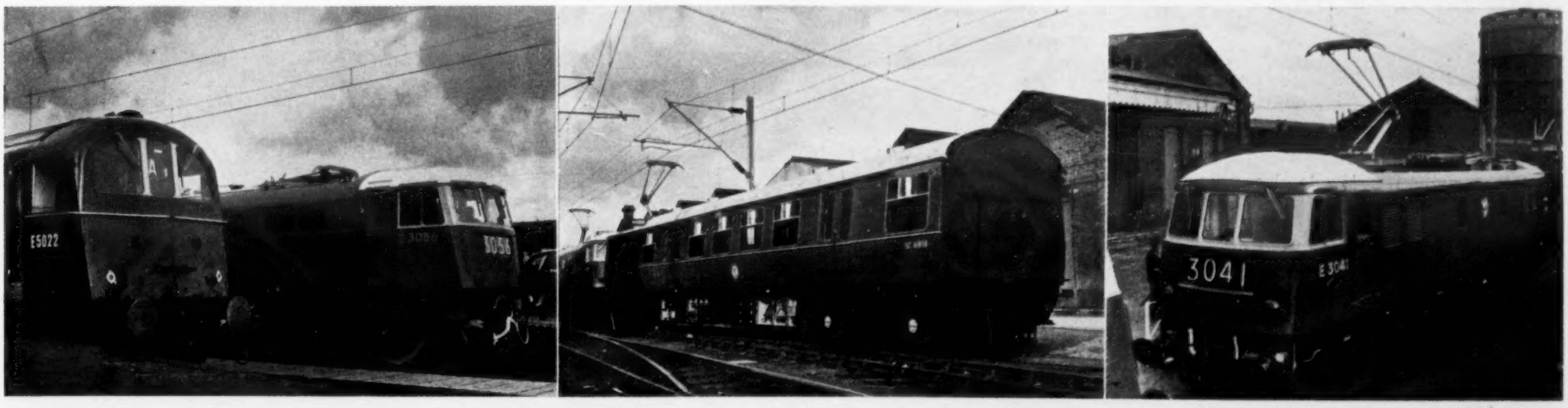
Due to the physical limitations which exist to a far greater extent in this country than in most others, the question as to whether there was room for a high-voltage contact system was perhaps the most important matter for decision. In practice, the majority of bridges required lifting, and in such cases it was often immaterial whether the bridge was to be lifted 10 in. or 20 in., i.e. the question of a.c. or d.c. system was of no significance. The problem was only acute when the bridge or obstruction could not be raised on practical grounds, of cost. The alternative of lowering the track is not often an acceptable alternative, and other methods had to be considered. These comprised reduction of voltage, dead section, or secondary insulation—and all methods are in use where circumstances require them. Prior to approval being given to the adoption of 50-cycle traction, British Railways were subject to clearance regulations laid down by the Minister of Transport in 1928, that is, in advance of any practical experience of what was adequate for British conditions.

The clearance figures adopted (substantially those recommended by U.I.C.) were 4 in. for 1,500 volt d.c., or 6,250 volt a.c., 11 in. for 25,000 volt a.c., which figure could be reduced to 8 in. when the clearance is of short duration, e.g. between collector gear and any part of a structure, or is due to uplift of the wire. Considerable experience, both experimentally and in practice, has now been obtained on this important question, with the result that these values are now considered to be more than adequate for the worst conditions. Developments in the use of glass fibre covered with P.T.F.E. have made it possible to substitute supports in tension in place of porcelain which is providing a lighter, cheaper, stronger and cleaner arrangement. After considerable research a special form of synthetic rubber mat ½ in. thick, 6 ft. 6 in. wide, reinforced by steel plates and arched for mechanical rigidity, is held in position by simple clamps for bridge insulation. P.T.F.E. covered glass fibre is also being introduced into the construction of section insulators, which are used to provide an electrical interruption of the contact wire while permitting mechanical continuity of the passage of the pantograph pan. In short, formidable problems of getting adequate electrical clearance are being solved successfully by a variety of methods which will set new standards of design and quality with overall economic benefits.

The Interference Problem

One of the most controversial matters is the degree of electric disturbance caused to signalling and telecommunication circuits along or near the electrified lines. It is normally accepted modern practice to replace existing open wire routes on poles by cables whose sheaths can form an adequate

(*Continued on page* 18)



A closer view of the third rail and B.R.-A.E.I. locomotives; a Pressed Steel-A.E.I. motor coach for the Glasgow suburban electrification and, right, a North British-G.E.C. locomotive with the Stone-Faiveley pantograph extended. Five a.c. locomotives were shown in all—details are tabulated on page 7 and an English Electric locomotive is illustrated on page 9

promised comparatively rapid results. The high-voltage a.c. system, on the other hand, bristled with unsolved problems. Yet it not only opened up possibilities of considerable economies, but also produced clear advantages in operating efficiency.

"Careful study of the results of experiments, and a thorough appraisal of the business economics involved, culminated in the Commission's decision to adopt the present system, which we believe will be of decisive benefit to Britain's railways. In implementing this decision we are being greatly aided by the skill and co-operation of the British electrical engineering industry.

World Scope

"There can at present be no doubt that this system of railway electrification offers scope for spectacular development throughout the world. Some countries have already had striking successes with it, for we are by no means alone in this field.

LORRY—BUS—COACH

Action on Diesel Exhaust Fumes

ACTION is to be taken by the Minister of Transport by regulation to prevent the misuse of excess fuel devices on diesel-engined road vehicles, thereby causing dense exhaust fumes. He proposes to amend the Motor Vehicles (Construction and Use) Regulations by inserting a provision as follows:

> (Regulation 21A): where a motor vehicle, being a vehicle propelled by a compression ignition engine, is fitted with a device which facilitates the starting of the engine by causing it to be supplied with excess fuel any apparatus by means of which the device is operated shall be fitted in such a position that it cannot be operated by the driver of the vehicle while he is driving.

The covering letter acknowledges that improper resort to the cold-starting device is only one cause of excessive exhaust fumes, which are more noticeable from heavyweight vehicles than those in the medium range.

Road Haulage Wages

PUBLISHED last week by the Road Haulage Wages Council was proposal RH(69) which follows the recommendation made by the Council a month earlier for wage increases for road haulage workers. As indicated in our September 3 issue basic rates will be increased by between 10s. and 11s. 9d. and the subsistence allowance will be raised from 16s. to 18s. The period for statutory objections now ensues. In recent years a period of 8-10 weeks has elapsed between the publication of a proposal and the commencement of the subsequent order; the new wage scales may therefore be expected to come into force in the first half of December.

Yorkshire Milk Collection

BULK collection of milk in tankers was started in two areas of Yorkshire, Malton and Selby, on October 1. Eleven farms are taking part at the beginning of the project which is being operated by Northern Dairies, Limited, of York. This company is building a new dairy designed solely for bulk reception; eventually it will take 4,500 gal. a day. At present one 1,500-gal. tanker is making two trips daily.

Fare Reduction a "Vain Hope"

SAYING he thought the proposal untimely, Mr. J. A. T. Hanlon, chairman of the Northern Area Traffic Commissioners, turned down that part of a West Hartlepool Corporation fares application which sought to reduce the minimum bus fare from 2d. to 1½d. for one stage. Mr. Hanlon described the move as "a vain hope that it might induce a reluctant public to start travelling on the services to such an extent as to recover the losses which were bound to occur by reducing a particular fare by 25 per cent."

Penalty Payments for B.R.S. Drivers

THE Transport and General Workers Union has reached agreement with British Road Services on extra pay for drivers and ancillary grades in respect of staggered starting times. Work started between noon and 2 a.m. is classed as night work. Staff who start work at times falling outside the period between 6 a.m. and 8.30 a.m. will be entitled to a penalty payment of 5s. when the starting time is not more than one hour outside this period, 7s. 6d. when it is between one and two hours outside, 10s. between two and three hours, and 12s. 6d. when over three hours outside.

Ambitious Manchester Area Map

SERVICES of all the operators in the Manchester and Salford area (including A. Mayne and Son) are shown on the latest edition of the bus map published by the Town Hall Information Bureau at Manchester. It costs 9d. A complete list of all public bus services entering the area is included (i.e., works services, etc., are excluded). The area covered by the map extends from Radcliffe and Royton in the north (including Oldham) to Altrincham and Poynton in the south and from Walkden in the west to Stalybridge in the east. There are inset street plans of the centre of Oldham and Stockport. The separate street plan of the centres of Manchester and Salford shows the whereabouts of every bus stopping place and the relative routes. The publishers say that it is hoped to improve the presentation in later editions.

Revolt Against Three-in-Two Seating

LED by a group of three 14-year-olds, some 20 schoolchildren at Finningley, near Doncaster, have been instrumental in getting a double-deck school bus to Armthorpe instead of the single-decker. They said that a 32-seater was not big enough; the contractor explained that it usually carried three children in every two seats, as permitted by regulations.

To Liverpool via Birkenhead

WHAT was claimed to be a new record for the heaviest load ever carried on British roads left Sheffield for Liverpool on Tuesday this week. It was the first of two 180-ton mill housings for the new aluminium rolling mill of James Booth Aluminium, Limited, which will be the largest of its type in Western Europe. The housing, which was cast by English Steel Castings Corporation, Limited, at Sheffield, was being taken for machining to the Netherton works, Liverpool, of the English Electric Co., Limited. Because of weight restrictions on bridges, and the narrowness of certain roads, an indirect route had to be planned via Birkenhead and thence across the Mersey to Liverpool. The crossing—expected to take place this weekend—will be on a 200-ton floating crane which will carry the casting lashed to its deck. The empty Pickfords road train will be transferred to Bootle through the Mersey Tunnel—so that the casting can be reloaded for the one-hour journey to the English Electric works.

Three Leyland group vehicles ready for delivery to three subsidiary companies of the Rhodesia United Transport group. At the left is a Leyland Super Hippo with a Zambesi Coachworks aluminium-bodied semi-trailer, for Central African Road Services, Limited; in the centre an Albion Reiver with a 2,000-gal. Brockhouse fuel tank for operation by Bulwark Transport, Limited, on oil company contracts; at the right a Scammell Scarab with 6-ton Scammell semi-trailer, for Swift Transport Services, Limited

Defective Vehicles Supplied on H.P.

IN the High Court last week a reserved judgment was delivered to the effect that a hire purchase and finance company cannot recover damages against the hirer of a motor vehicle which was supplied to him in a defective condition if the finance company has not obtained the views of the dealer as to the condition of the vehicle. The case concerned a secondhand 1952 van supplied by a dealer, who entered into an agreement with the finance company, Yeoman Credit, Limited, whereby he received the outstanding balance due on the vehicle and Yeoman Credit became the seller. The hirer alleged that the vehicle was seriously defective from the outset. Master Jacob said that if finance houses engaged in buying vehicles from dealers and letting them out on hire purchase agreements they should take reasonable steps to see that the vehicles were satisfactory. It was stated to be the view of the finance company that it had no recourse against the dealer and that dealer and hirer should sort out any complaints; this was a misconceived view, said the judgment.

C.W.S. Reschedules its Drivers

UNDER an agreement reached between the Co-operative Wholesale Society and the Transport and General Workers Union and the Union of Shop, Distributive and Allied Workers, the working hours of drivers and mates employed by the C.W.S. in its traffic departments are to be reduced to 10 per day with effect from October 3. A bonus of 15 per cent will be paid on basic rates to compensate for the reduction in working hours. These changes apply in the first instance to men employed on heavy lorries of over 3 tons unladen weight and are meant to take advantage of recent changes in the speed limit for heavy goods vehicles. However, it has also been agreed to make similar arrangements for drivers of smaller vehicles not directly affected by the change in speed limits provided that the existing work content can be performed when existing working hours are reduced by one-eleventh. In this case, too, the normal maximum working day will, therefore, be 10 hours. There are certain exceptions to the agreement. This C.W.S. agreement is broadly in line with that put into effect by British Road Services at the beginning of this year.

L.T.E. Now Invites Wage Claim

AT the invitation of London Transport, the Transport and General Workers Union is to submit a wage claim in respect of London bus crews which, it is rumoured, may be of the order of £2 per week or even more. This would obviously aim at reducing the bus-Underground differential. The union executive states that when the L.T.E. chairman, Mr. A. B. B. Valentine, saw the union general secretary, Mr. Frank Cousins, last week to discuss the union proposal for an impartial inquiry into busmen's wages, Mr. Valentine said that it was "desirable that the earnings of bus crews should be increased" and that the best way to do this was by "direct negotiations" rather than an inquiry.

Mr. Valentine expressed himself aware that the incentive bonus scheme (which would have been paid for out of increases in productivity) had been rejected by the bus crews, and he therefore asked the union to make "their alternative proposals for improving earnings." There is a possibility that the men may also seek a reduction in the hours of Saturday and Sunday duties, which are regarded by them as making the job additionally unattractive.

Bus and Coach Developments

From October 12 London Transport night bus routes 284-299 will be renumbered N84 to N99. This will free 16 numbers in the 1-299 series used for Central area bus routes, which was approaching exhaustion due to the trolleybus-to-bus conversion programme.

The winter edition of the *A.B.C. Coach and Bus Guide* includes a number of new facilities despite the tendency of these to appear mostly in summer months. These include the extension of the erstwhile Corona service from Hartest to Bury St. Edmunds. This extension is not available to London passengers to or from Ilford or points west thereof. This Index publication costs 5s

now
MORRIS
introduce
power-plus
J4
10–12 cwt light van

In the new J4 van, Morris give you a 1,500 c.c. engine to handle bulk with weight. Sliding or hinged front doors combine with low floor line to speed driver access. Low platform eases goods handling. Dynamic styling commands attention, builds prestige. A wealth of features—independent front suspension, hydraulically actuated clutch, floor mounted gear change, all-steel construction, special grip handles—add safety and efficiency. Morris reliability shows you saving service.

SEE THE MORRIS

MULTI-CHOICE RANGE *

you're **loads** better off with
MORRIS
commercial vehicles
MC81

* The full Morris series includes:—
10 cwt., 1 and 1½ ton vans, J2 van, pick-up and minibus, 1½, 2, 3, 4, 5 and 7 ton trucks, 5 and 7 ton tippers. Also prime movers. Forward or normal control, petrol or diesel engines.

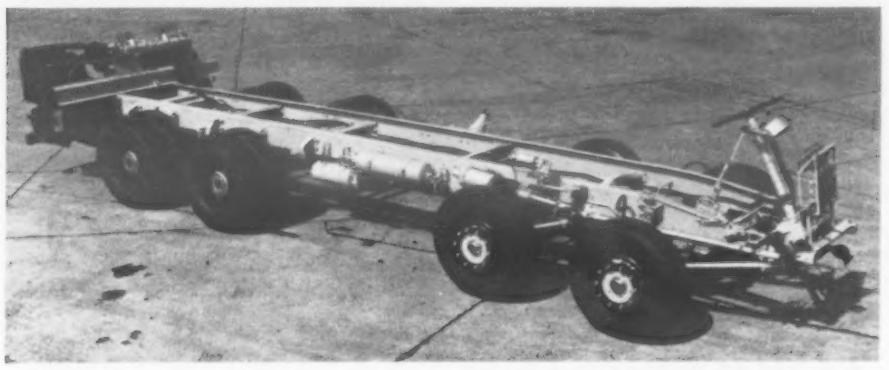
12 MONTHS' WARRANTY
BACKED BY BMC
Europe's most comprehensive service

MORRIS COMMERCIAL CARS LTD., ADDERLEY PARK, BIRMINGHAM, 8 Overseas Business: Nuffield Exports Ltd., Oxford and 41-46 Piccadilly, W.1

ROAD VEHICLE INDUSTRY

Spanish Company Board Meets at Leyland

THE board of Spain's largest commercial-vehicle manufacturing concern, Empresa Nacional de Autocamiones S.A. (E.N.A.S.A.), had an unusual venue for its latest meeting. It was held at the Spurrier Works of Leyland Motors, Limited, at Leyland in Lancashire. Reason for the extraordinary venue—normally board meetings are held at E.N.A.S.A.'s head office in Madrid—was that most of the directors are in Britain visiting factories of the Leyland Motors Group, two of whose directors are also members of the E.N.A.S.A. board. They are Sir Henry Spurrier, chairman and managing director of Leyland Motors, Limited, and Mr. Donald G. Stokes, the company's sales and service manager. During a visit to Leyland on September 20, the E.N.A.S.A. board held discussions which will lead to even closer liaison in the future between the Spanish company and Leyland Motors. It will be recalled that in December last year a financial link was announced between E.N.A.S.A., maker of the Pegaso range of lorries and buses, and Leyland; for some time before that there had been an interchange of technical information between the two companies.



Leyland Dromedary four-axle chassis developed particularly for road tankers, mechanical units of which have been used in the chassisless Thompson Autotanker built for British Petroleum. Features are rear-mounted 140-b.h.p. diesel engine, four-speed semi-automatic S.C.G. gearbox, two-speed single driving axle and leaf-air front suspension. There is an uninterrupted frame length of 27 ft. 6 in. ahead of the engine

French Test of Rocol Molyspeed

RECENT tests have been carried out by the Institut Francais du Petrole to assess the value of molybdenum disulphide addition to lubricating oils, using 6 per cent Rocol Molyspeed, manufactured by Rocol, Limited, Swillington, near Leeds. Radioactive tracer measurements giving direct information on losses from irradiated piston rings in a working engine—in this case a Renault Dauphine driven in and around Paris—showed that Molyspeed reduced the rate of wear by 64 per cent compared with a premium brand of motor oil containing conventional anti-oxidant and anti-wear additives.

A.E.C.-Merryweather at Fire Conference

SAID to be the only all-British turntable ladder available, an A.E.C. Mercury-Merryweather hydraulically operated 100-ft. appliance was one of two A.E.C.-based Merryweather machines exhibited at the recent joint Fire Officers and Engineers Conference at Bournemouth. The 100-ft. turntable ladder has been built for West Ham Fire Brigade and the other—a dual-purpose appliance on a Merlin chassis, incorporating a 950-g.p.m. turbine pump—is for Southend-on-Sea Fire Brigade.

Anti-Corrosive Liquid Metal

DEVELOPED by Stewart Wales, Somerville, Limited, Cambuslang, Glasgow, Galvalloy is a new anti-corrosive liquid metal alloy which can be applied by brush or spray. It is a compound of anodic metal particles suspended in a plastic anti-corrosion medium. By making use of a natural phenomenon, the metals separate upon application into two parallel layers of high-purity metal having different electric potentials. The lower darker layer is the functional galvanic coating which protects a ferrous surface from rust; the top layer is a light metallic weather foil which protects the functional coating from oxidation by weather exposure. Galvalloy is claimed to be the greatest advance in ferrous metal protection since galvanising, providing all the benefits of conventional galvanising at less than a third of the price. It is said to inhibit rust for as long as hot-dip galvanising and to be completely incombustible; it will withstand red heat and minor cuts or scratches are self-healing.

7½-ton Capacity Thames Trader

LAST-MINUTE addition by Ford Motor Co., Limited, to the Thames Trader range exhibited at the Commercial Motor Show at Earls Court was the Trader 75 developed for the domestic market. With a maximum gross vehicle weight of 25,000 lb. and a payload of 7½ tons, the Trader 75 is produced in 138-in. and 160-in. wheelbase chassis-cab and chassis-windscreen forms while system recently adopted for the Trader range. The price of the diesel-engined 160-in. wheelbase chassis-cab is remarkably low at £1,228.

Incombustible Non-Toxic Rust Remover

CLAIMED to be a harmless and effective method of removing rust from exterior and interior surfaces, Pitan rust remover, introduced by Allweather Paints, Limited, 36 Great Queen Street, London, W.C.2, is particularly suitable for use in closed systems where mechanical or conventional chemical methods of rust removal are impractical. The material contains no phosphoric or hydrochloric acids and all ingredients used are non-combustible and non-toxic. Small trial samples of the new product are available from the manufacturer.

This large front-end moulding is one of 100 components of glass-reinforced Bakelite polyester resin used in Midland "Red" D9 double-decker, 95 of which are now building

Sidewall Scuff Band Additions

THE sidewall scuff band introduced recently by the Goodyear Tyre and Rubber company is now made in three sizes, namely 25 by 6 eight-ply, 27 by 6 eight-ply and 23 by 5 eight-ply and 10-ply ratings in the Rib All Weather pattern. The Goodyear sidewall scuff band, a band of tough rubber moulded to both tyre sidewalls which incorporates the exclusive Goodyear sidewall depth indicator, has been developed to minimise the effects of kerbside chafing and scuffing.

Commer chassis by Rootes, insulated metal bodies by Sparshatts and Thermo King refrigeration equipment by Hawker Siddeley (Hamble) comprise these refrigerated milk-transport vehicles for operation in the Middle East by UNICEF

Bristol Siddeley—S.R.M. Agreement

AGREEMENT is announced between Bristol Siddeley Engines, Limited, and Svenska Rotor Maskiner Ab., Stockholm, for the manufacture at Bristol Siddeley's power division, Coventry, of the range of SRM hydrodynamic torque converters. The SRM unit has been widely used in vehicle transmissions by Swedish and other manufacturers. A dual-rotation feature of the SRM design is claimed to provide an unusually wide range of ratio—up to 9 to 1 at stall—with excellent efficiency, making it particularly suitable for road-vehicle and railcar application.

Firestone
SUPER MILEAGE LUG

THE DUAL-PURPOSE REAR-WHEEL TRACTION TYRE
with all the features you're demanding

POWER BITE TRACTION
Be it on main roads, by-roads, or no roads the Super Mileage Lug tyre's cross grooves, heavy shoulder lugs and circumferential ribbing will combine to give maximum bite and traction and long safe wear. The dual-purpose Super Mileage Lug helps reduce mechanical maintenance too. Many so-called dual-purpose tyres slip and spin causing undue strain on engines and transmissions. But with the POWER BITE TRACTION of the Super Mileage Lug, this profit-draining problem is practically eliminated.

MORE SKID DEPTH
Deeper non-skid pattern than in ordinary highway tyres gives thousands of miles of sure-footed highway hauling.

SUPER STRENGTH BODY
Super Gum-Dipped, Tension-Dried cords make a really strong, durable body which gives big dividends in tyre mileage and vehicle efficiency.

OUTPULLS AND OUTLASTS any tyre of its kind. Specially designed for on-and-off-the-road service where a large part of the work is off-the-road and particularly severe.

EXPERIENCE COUNTS
45 Factories throughout the world.
Firestone total sales exceed £1,000,000 per day.

DRIVE SAFELY

Firestone TYRES—
consistently good

CUT YOUR
Cost per mile
—specify OLDHAM high-performance batteries

With cost per mile continually rising, you must exploit every possible economy if you are to go on giving the best possible service. Oldham can help you! The low initial cost, extra efficiency, top power/weight ratio and long life of Oldham batteries make them your best investment. Ask for an Oldham engineer to call and advise you on the best types for your fleet.
High capacity TX, MX and REG series feature 'X' metal grids, 'Fibrak' separators, vitreous felt retainer mats, cold-start plates. Moulded ebonite (hard rubber) containers or, if required, double-impregnated hardwood containers. Capacities for every need.

OLDHAM
HIGH PERFORMANCE
BUS AND C.V. BATTERIES

Fitted as standard equipment by the leading British chassis builders

OLDHAM & SON LTD · DENTON · MANCHESTER · Telephone: DENTON 2431

NEW MILL FOR BRITAIN

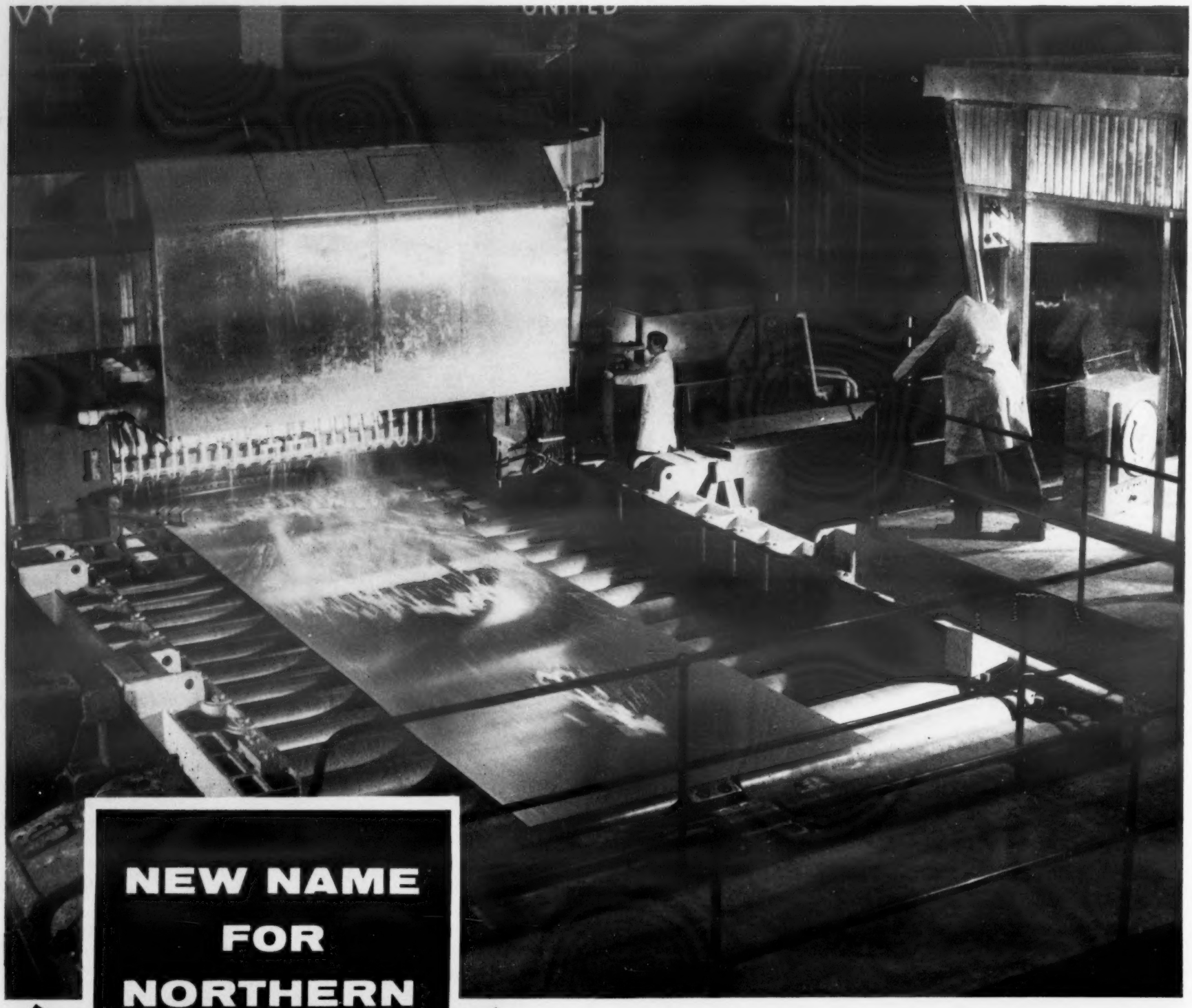
This 8,000 horse-power 144-inch mill, first stage in a 'hot line' one-third of a mile long, is the centrepiece of the latest expansion of the continuous strip mill at Rogerstone, Monmouthshire.

New equipment and modernisation at a cost of over £7 million makes Rogerstone the largest aluminium rolling mill in Europe, with a nominal capacity of 70,000 tons of sheet and strip products a year, plus a substantial extra capacity for hot-rolled coil and plate. It demonstrates the determination of Alcan Industries – the new name of Northern Aluminium Company – to maintain their position as leading suppliers of aluminium products to British industry.

Aluminium alloy plate over eleven feet wide can be produced by the big new mill, compared with the maximum width previously available of about seven feet. This wide plate offers the designer more scope and can save time and money in construction. This mill thus complements the other facilities at Rogerstone for production of high-quality, flat, accurately-sawn plate: a 4,000 ton stretcher and special plate saw.

Leadership in equipment is backed by long experience in the application of aluminium, including joining methods. If you use, or might well use, aluminium, for expert advice get in touch with your nearest Alcan Industries (formerly Northern Aluminium) office.

The largest aluminium rolling mill in Europe



NEW NAME FOR NORTHERN ALUMINIUM

COMPANY LIMITED

This new name identifies the company more clearly as a member of the Aluminium Limited of Canada enterprise comprising some fifty companies in all parts of the world. Emphasis is thereby laid on the advantages that the company and its customers enjoy in being able to avail themselves of the Group's extensive research and development resources, and its great fund of experience in the smelting, manufacture and application of aluminium.

ALCAN INDUSTRIES LIMITED

ALCAN
A member of the ALUMINIUM LIMITED OF CANADA group of companies

Sales Offices: **BELFAST**: Donegall House, 7 Howard Street, Belfast 32805 · **BIRMINGHAM**: Devonshire House, Great Charles Street 3. Central 7393 · **BRISTOL**: Peloquin Chambers, 18 St. Augustine's Parade 1. Bristol 20351 · **LEEDS**: 26-27 Park Row 1. Leeds 33621 · **LONDON**: 50 Eastbourne Terrace W2. Paddington 3281 · **LUTON**: 57 Bute Street, Luton 7364-5 · **MANCHESTER**: 23 Princess Street 2. Central 9335 **NEWCASTLE UPON TYNE** Groat House, Collingwood Street 1. Newcastle 20878 · **Castings & Forgings Sales Division**: Middlemore Road, Handsworth, Birmingham. Northern 3671.

TBW 71C

POINTS FROM THE PAPERS

Locomotives, Rolling Stock and Equipment

B.R. PLANNING REQUIREMENTS

THE substantial plans of British Railways to electrify some of its main lines with the 50-cycle a.c. system have attracted great interest in railway circles all over the world, and British Railways consequently invited railway engineers from the Commonwealth and foreign countries to attend the British Railways Electrification Conference which opened in London on Monday. Delegates had an opportunity of hearing British experts describe what has been so far achieved, and their further plans, and they were also shown the new electric train services on the Manchester—Crewe line and work on the Colchester—Clacton—Walton line, while there has been an exhibition at Battersea Wharf of the new locomotives and other electrical equipment.

The paper presented by Messrs. H. Wilcox and C. J. Clemow described the basis of design of the various multiple-unit vehicles, and these are set out in an accompanying table.

Further papers dealt with the multiple-unit stock for the London—Tilbury—Southend electrification, as supplied by English Electric, the multiple-unit train equipment for Liverpool Street to the Enfield, Hertford East and Bishops Stortford lines as supplied by General Electric, the multiple-unit trains for Manchester—Crewe as supplied by A.E.I., Rugby, and the trains for the Glasgow electrification as supplied by A.E.I., Manchester.

LOCOMOTIVES FOR B.R. MAIN LINE WORK

Manufacturer		*A.E.I. Rugby*	*A.E.I. Manchester*	*B.R./A.E.I.*	*G.E.C.*	*E.E.Co.*
Locomotive Nos.		E3001-23	E3046-3055	E3056-3095	E3036-3045	E3024-35
Total weight	Tons	80. 0	78. 4	79. 0	77. 0	73. 0
Maximum axle loading	Tons	20. 0	19. 6	19.25	19. 4	18. 3
Weight of electrical equipment (including drive)	Tons	39. 6	37. 7	39. 0	38. 0	37. 0
Weight of two bogies (excluding motors and drives)	Tons	21. 0	21. 0	21. 0	21. 0	19. 5
Weight of underframe and body	Tons	19. 4	19. 7	19. 0	18. 0	16. 5
Length over buffers	ft.	56. 5	56. 0	56. 5	53. 5	52. 5
Bogie wheelbase	ft.	10.75	10. 0	10.75	10. 0	10. 0
Bogie centres	ft.	31. 5	30.75	31. 5	29. 5	30. 0
Gear ratio		29/76	29/76	29/76	25/74	25/76
Tractive effort for acceleration	lb.	48,000	48,000	48,000	48,000	40,000
Continuous ratings at wheel tread at 22.5 kV and half worn wheels						
Tractive effort—						
Full field	lb.	20,000	20,000	20,000	21,000	20,000
Weak field	lb.	17,000	17,000	17,000	17,500	15,260
Speed—						
Full field	m.p.h.	60	62	60	54	55
Weak field	m.p.h.	71	73	71	66	73
Power—						
Full field	h.p.	3,200	3,320	3,200	3,000	2,940
Weak field	h.p.	3,200	3,310	3,200	3,080	2,950
U.I.C. Rating: (1 hr. s.h.p.)		4,260	4,260	4,260	4,270	3,735

Locomotives

A number of papers dealt with the new locomotives, and paper No. 3, presented by Messrs. E. S. Cox and G. G. Kibblewhite, explained the underlying basis for the choice of the types of locomotives which are forming the initial fleet of 100. The locomotives are broadly divided into two types: type A being a mixed traffic locomotive while type B has a bigger drawbar pull such as will be required at a later date for working fully braked express freight and mineral trains. It was considered that the mixed-traffic type would be mainly required for the London Midland Region main line from Euston to Manchester and Liverpool, while on the Eastern Region main line between Kings Cross and York and Leeds a substantial number of trains could be worked by multiple-unit operation, and this line would therefore require mainly freight locomotives.

The duties to be performed by the locomotives allowed the designer a wide range of possibilities, and conditions were laid down as follows: *Type A:* The locomotive is to be capable of hauling a 475-ton express passenger trailing load from Manchester Piccadilly to Euston with a balancing speed of 90 m.p.h. on level tangent track and a maximum running speed of 100 m.p.h. The average speed is 67 m.p.h. with one stop of 1 min. and 4 miles at 15 m.p.h. additional speed restrictions for track maintenance.

The locomotive is also to be capable of hauling a 950-ton freight train between Manchester Longsight and London Willesden at an average speed of 42 m.p.h. with a maximum speed of 55 m.p.h. The locomotive will also have to work 500-ton express freight trains (fully fitted) at a maximum speed of 60 m.p.h. over this section. The locomotive is, furthermore, to be capable of making three consecutive starts with the 950-ton train up to 20 m.p.h. on a 1 in 100 gradient, and to be capable of working without damage to the equipment with this train for 10 miles at 10 m.p.h. on any part of this route. The last requirement, which is a somewhat unusual one, should cover working in dense fog, a climatic circumstance which, unfortunately, still prevails fairly frequently in Britain.

The *Type B* locomotive is to be capable of hauling a 1,250-ton goods train between London and Manchester at an average speed of 42 m.p.h. with a maximum speed of 50 m.p.h., otherwise under the same conditions as type A.

Freedom for Builders

Considering the experience (or lack of it) at the time when ordering the locomotives, of the various manufacturing firms in building a.c. locomotives, the Commission decided that in the first instance d.c. motors with rectifier conversion were to be specified. The building firms, however, were given complete freedom about high or low voltage tap change speed control and the mechanical design of framework and bogies was largely left to them. Certain items were to be standardised from the beginning, such as cab layout, the use of certain standard mechanical components, and also pantographs and air-blast circuit breakers. The main particulars of the first five types are given in the accompanying table, together with their manufacturers. Space does not, unfortunately, allow one to enter into details of this interesting paper or the other papers describing the various aspects of the locomotives.

The paper presented by Mr. E. L. E. Wheatcroft dealt with the consulting engineers' contribution to 50-cycle electrification. Some of the leading firms of consulting engineers specialising in traction were instructed to report on interference with communication circuits, and, furthermore, with the insulation of bridges. Other remits concerned lightning arrestors, voltage changeover, and system tests. Messrs. Merz and McLellan was also asked to report on other electrification schemes and the relative economics of electric and diesel traction.

Power Supply

A further series of papers dealt with power supply and its problems. The paper by Mr. W. J. Webb described how power is to be obtained by the British Transport Commission for the new single-phase electrification. Normally supplies will come from the 132-kV national grid system, and the supplies will be taken by the railway in duplicate as single-phase current at 25 kV through transformers supplied by the British Electricity Authority. The current will then be taken to railway feeder stations spaced 20 to 30 miles apart. The total demand as can be estimated at present for the three main schemes of electrification, that is the London Midland Region main line, the Glasgow suburban lines, and the Eastern Region suburban lines (comprising some 790 route miles and 2,500 single track miles) will be of the order of 200 MW with an annual consumption of 950 million units.

The various papers then dealt with the equipment required and also the problems which arise with supplying power to a high-voltage single-phase system as compared with a d.c. system. A paper described the special problems introduced by the decision to use booster transformers with and without return conductors for the reduction of interference, with special reference to the effect on voltage distribution. Other papers on power supply were concerned with the switchgear, the remote control of power distribution, and protection systems.

Overhead Line

Another set of papers dealt with the overhead line equipment. Railway electrification in Great Britain presents in this connection some special problems owing to the heavy traffic density on the principal lines, and although the trains are, perhaps, not very heavy in themselves, they amount to 50 to 150 or more in each direction per 24 hours. Furthermore, loading gauges in this country are more restricted than abroad. The large number of roads crossing the railway, and the frequent train services, make level-crossings impracticable, and therefore result in many overbridges which have to be adjusted to take overhead equipment. The papers described in detail the equipment which it is intended to use, and a further paper described the catenary system which the B.T.C. is to use throughout.

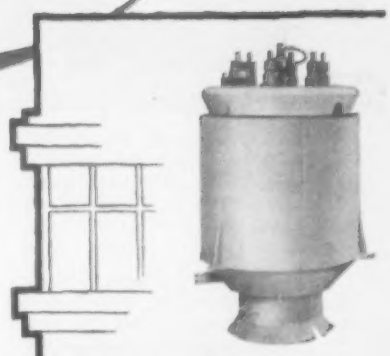
Further papers dealt with signalling equipment to meet the needs of high-tension electrification. Interference with signalling and communication circuits was expected to be severe as a result of experience with the L.B.S.C. 6,600-volt 25-cycle system. Mr. A. W. Woodbridge, chief signal engineer, B.R. Central Staff, described the remedial measures taken and the results of tests made at Fenchurch Street in 1957 when the overhead d.c. traction wires were temporarily converted to a.c. feed, which indicated that the d.c. impedance band was suitable for a.c. traction current and an a.c. signalling supply at 83⅓ cycles.

MULTIPLE-UNIT A.C. STOCK

Service	*Region*	*No. of Units*	*Coaches per Unit*	*Coaches built at*	*Electrical Contractor*
London—Tilbury—Southend	Eastern	112	4	B.R. York and Doncaster	English Electric
Glasgow Suburban	Scottish	91	3	Pressed Steel Co., Limited	A.E.I. (Manchester)
Manchester—Crewe Liverpool	London Midland	45	4	B.R. Wolverton	A.E.I. (Rugby)
Liverpool Street—Enfield—Chingford	Eastern	52	3	B.R. York	G.E.C.
Liverpool Street—Bishops Stortford—Hertford East	Eastern	19	4	B.R. Doncaster	G.E.C.
Conversion of Liverpool Street—Shenfield	Eastern	92	3	Converted at B.R. Stratford	A.E.I. (Manchester)
Conversion of Liverpool Street—Southend (Victoria)	Eastern	32	4		
Liverpool Street—Chelmsford—Southend (Victoria); Colchester—Clacton, etc.	Eastern	42	4	B.R. York	English Electric

RECTIFIERS
for railway service

There's a wealth of experience and 'know how' behind AEI rectifier equipment for railway electrification. *Three-quarters of a million kilowatts* of AEI rectifiers are in service or on order for traction service in all parts of the world. This total includes 200,000 kW of semiconductor rectifiers ordered by the B.T.C. for British Railways' new 25 kV a.c. locos and motor coaches. AEI supplied the first British-built mercury-arc rectifier substation equipment to be commissioned in Britain, and were also responsible for the development of the first semiconductor rectifiers for traction duty.

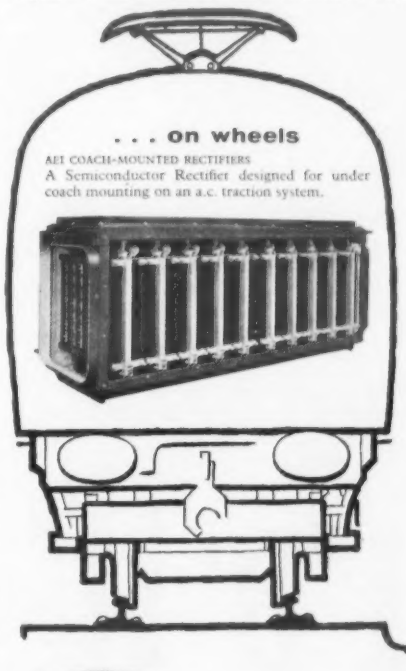


at the trackside . . .

AEI SUBSTATION EQUIPMENT
Above: A six-anode pumpless steel tank rectifier for d.c. traction service. Below: Mercury-Arc Rectifier substation.

. . . on wheels

AEI COACH-MOUNTED RECTIFIERS
A Semiconductor Rectifier designed for under coach mounting on an a.c. traction system.

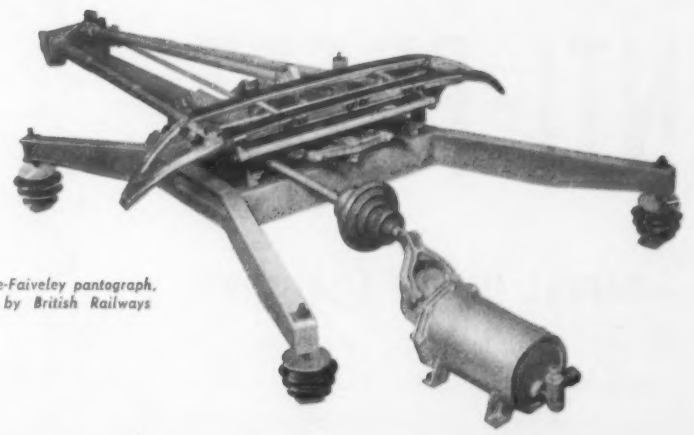


AEI Traction Rectification Equipment includes
- SIX-ANODE PUMPLESS STEEL TANK MERCURY-ARC RECTIFIERS
- SINGLE-ANODE STEEL TANK RECTIFIERS
- GERMANIUM and SILICON SEMICONDUCTOR RECTIFIERS

AEI
Associated Electrical Industries Limited
Heavy Plant Division
RUGBY, ENGLAND

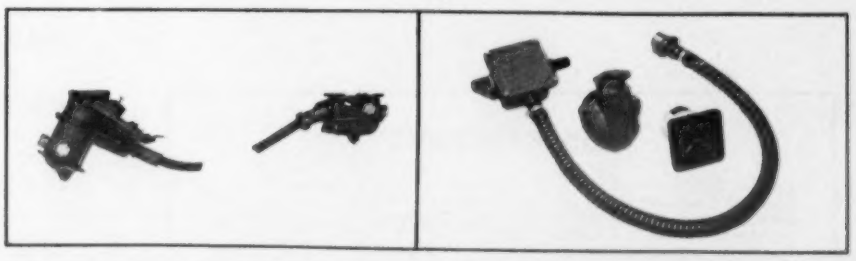
A5506

progress through electrification



The Stone-Faiveley pantograph, adopted by British Railways

Some important items of equipment specially designed for use in railway electrification schemes have been shown on our Stand, No. 16, at the British Railways Electrification Exhibition. They included Stone-Faiveley pantographs and intercoach couplers, Smith-Stone speed indicating and controlling equipment, the Stone Carriage Temperature Controller and the Stone Battery Charge Unit that supplied power for lighting the rolling stock on display. We shall be pleased to provide further particulars of these equipments on request.



Stone-Faiveley intercoach couplers

Smith-Stone speedometer equipment

J. STONE & CO (DEPTFORD) LTD
ARKLOW ROAD LONDON SE14

REGULAR CARGO SERVICES

between
LONDON
and

HAMBURG, BREMEN, RHINE PORTS, HARLINGEN, AMSTERDAM, ROTTERDAM, ANTWERP, GHENT, TERNEUZEN, DUNKIRK, CALAIS, BOULOGNE, TREPORT, DIEPPE, HAVRE, CHARENTE, BORDEAUX.

Coastwise to HULL

also between the following ports
LONDON, NEWCASTLE, MIDDLESBROUGH, and SOUTHAMPTON and OPORTO and WEST ITALIAN and SICILIAN PORTS.

BRISTOL CHANNEL PORTS (Bristol, Barry, Cardiff, Newport, Swansea) and HAMBURG, BREMEN.

SOUTHAMPTON and ANTWERP, ROTTERDAM, BREMEN, HAMBURG.

CONTAINERS

DOOR TO DOOR SERVICE OFFERED BETWEEN U.K. AND THE CONTINENT

The GENERAL STEAM NAVIGATION CO. LTD.
Three Quays, Tower Hill, London, E.C.3
Tel.: MINcing Lane 3000

LETTERS TO THE EDITOR

Orkney and Shetland

The Editor is always glad to receive letters from readers on subjects germane to the transport industry, but these should be written as concisely as possible. The opinions expressed therein must not, however, be regarded as having editorial endorsement. Where correspondents desire to use a nom-de-plume it is essential that the Editor should be informed of the name and full address of the writer as indication of good faith.

SIR,—With reference to the article in your issue of August 27 on short sea cruising, it is of interest to note that this year the North of Scotland, Orkney and Shetland Shipping Co., Limited, has been operating an additional cargo vessel carrying a limited number of first-class passengers only. This service has been running at approximately weekly intervals to and from Aberdeen and St. Margaret's Hope and Stromness, and there have also been weekly and/or fortnightly facilities from Leith to the same destinations. These sailings have figured in cruise 13 operated by the company from Leith late on Sunday or early Monday for Kirkwall direct, and leaving Kirkwall on Tuesday afternoon for Stromness. (A call was usually made at St. Margaret's Hope in alternate weeks.) The return voyage left Stromness at 5 p.m. on Wednesday, arriving Aberdeen Thursday morning and Leith early Friday morning. —Yours faithfully,

L. M. R. NICHOLSON.

151 *Pickhurst Lane,*
Hayes, Bromley,
Kent.

SIR,—In the article "Short Sea Cruises" in your issue of August 27, reference was made to the sailings of the N. of S.O. and S.S. Company and setting out *five* different routes. If my information is correct, I believe there are still sailings to Hillswick, Shetland, where the company owns an hotel and where one can spend a week's holiday or longer. The route was, and, I believe, still is, via Leith, Aberdeen, Stromness and Scalloway on the west coasts of Orkney and Shetland respectively.—Yours faithfully,

LAMBERT H. BAILEY.

56 *Oakleigh Gardens,*
*N.*20.

[Holiday tours were again available this year to the hotel at Hillswick and, indeed, to others in Shetland, but these were reached by road from Lerwick. Another correspondent's letter indicates an additional cruise which did serve Stromness.—Editor, MODERN TRANSPORT.]

Railway Work at Colchester

SIR,—It was interesting to hear of the improvements proposed in connection with electrification on the Eastern Region, in your issue of October 1, but how could you let it be said that the rebuilding of the station at Colchester has been completed! At the time of writing, the down platform has not even a building on it, let alone any awnings or other shelter. Neither has the burrowing junction yet burrowed. Rumour hath it that the works are behind schedule: could this account for your slightly fanciful description?—Yours faithfully,

J. A. B. HIBBS, M.Sc.(Econ.).

15 *Brooklands Avenue,*
Cambridge.

The name Underseal has been registered as a trade mark for rubberised underbody protective coating by Minnesota Mining and Manufacturing Company. This means that no other underbody protective coating may be described by the term Underseal and will enable the 3M Company to safeguard its guarantee of complete protection for the life of an Undersealed vehicle.

INDIAN TRACTOR MANUFACTURE

Impetus to Plans

PLANS to manufacture tractors in India by the associated David Brown company have been given new impetus by the Indian Government's decision to allow up to 3,500 tractors a year to be built, nearly three times the output permitted under the initial manufacturing licence granted last year. The initial licence, which covered the manufacture of only the 14-h.p. David Brown 2D, has now been amplified to cover manufacture of the latest David Brown 850 and 950 Implematic tractors, of 35 h.p. and 42.5 h.p. respectively. Manufacture will be carried out by David Brown Mahindra Tractors (Private), Limited, a company jointly owned by the U.K. company, David Brown Tractors, Limited, Huddersfield, and its Indian distributor, Mahindra and Mahindra, Limited, Bombay.

A new factory is now being built near Bombay to undertake production of the three types of tractors and implements. Until these premises are ready, part of the existing Mahindra and Mahindra plant is being utilised for assembly and distribution. The first consignment of semi-knocked-down tractors was shipped from the U.K. last month. Tooling equipment relating to 2D tractor manufacture has already been supplied by the David Brown factory at Huddersfield, which is currently preparing detailed plans for the provision of the extra plant which will be necessary for building 850 and 950 Implematic tractors in India. These tractors will initially be shipped s.k.d. but in due course it is planned to manufacture up to 66 per cent of components in India. A higher percentage of indigenous manufacture may be feasible ultimately, provided local industrial development reaches the stage envisaged under the Indian Government's current long-term plans.

In view of the expansion of the David Brown scheme, the authorised capital investment in David Brown Mahindra Tractors has been substantially increased.

SKEFKO RESEARCH

Subsidiary Company Mooted

FORMATION of a subsidiary company with the main purpose of developing the company's activities in technical and manufacturing research is under consideration by the Skefko Ball Bearing Co., Limited. The new company would be located near Irvine in Ayrshire, Scotland, where, subject to the satisfactory conclusion of present negotiations, it is intended to construct a factory with facilities for manufacturing production tools, equipment and some of the specialised machine tools used in the manufacture of ball and roller bearings.

It is not the intention of the company to reduce the present toolroom activities at Luton; on the contrary, it is hoped to develop these facilities still further. In addition it is intended to house at Irvine certain auxiliary departments concerned with manufacturing operations which can most conveniently be separated from the main production of bearings at Luton and Sundon.

The development in Scotland will result in some contribution to the Government's policy to provide employment in that area. It is expected to result in reduced importation of certain equipment and thus make the company more self-supporting in this respect. It will probably also provide the possibility of increasing exports to associated companies abroad. The company will continue to regard Luton as its main centre of operations and large additions to the Sundon plant and equipment are already on order.

ROLLING LIQUID TRANSPORTERS

In Service with the U.S. Army

FUEL-CARRYING tyres, developed by Goodyear Tire and Rubber Company from the Rolli-Tanker (MODERN TRANSPORT, February 27, 1960), are now in service with the United States Army in various parts of the world. Measuring 64 in. by 42 in. overall, each with a capacity of 500 U.S. gal. of liquid, the tyres are mounted on the wheels of towing dollies, which are said to be suitable for towing by virtually any vehicle. Large section and wide tread result in a very low ground pressure, providing good off-road performance.

Prototypes have been extensively tested over all types of terrain and recently tests have also been

Two Goodyear rolling transporters carrying a total of 2,000 U.S. gal. of fuel being towed across a lake by a U.S. Army amphibian

conducted in amphibious operation. In these later tests in Germany, a single dolly loaded with 1,000 U.S. gal. of fuel towed by an amphibious carrier across a lake is reported to have floated with 2 ft. of the tyres clear of the water and still floated easily when a second loaded unit was coupled in tandem.

The principal advantage of the rolling transporters is that the cargo space of a vehicle normally occupied by reserve fuel, or even water, is freed for other purposes.

SYNCOL 'B'

THE TOP QUALITY ANTI-FREEZE

—SAFEST IN THE LONG RUN!

Syncol 'B' is the top-quality anti-freeze, chosen by countless leading fleet operators and manufacturers. With over 20 years of research and experience behind it, Syncol 'B' provides 100% security for all diesel and heavy-duty petrol vehicles. It contains special inhibitors to guard against rust, corrosion and scale. It protects radiator, water-block and cylinder block against the worst weather that a British winter can provide—right down to 35° of frost (−3°F.). One filling gives year-long protection.

Syncol 'B' flows freely, can't evaporate, doesn't froth. Protect *your* fleet with safe, sure Syncol 'B'.

DISCOUNTS ON BULK ORDERS!
We are always happy to discuss special discounts on all bulk orders. Please write or phone to Synthite Ltd. today!

SYNCOL 'B'
ETHYLENE GLYCOL
ANTI-FREEZE

SUPPLIED IN 2 & 8 PINT CANS 5, 10 & 40 GAL. DRUMS

Conforms to B.S.S. 3151 . . . 1959 (Type B)

A product of Synthite Ltd., West Bromwich. Tel: Tipton 2245

DISTRIBUTORS

London & Home Counties: S. Norrish Ltd., 220 Great Portland St., W.1. **Midland Counties:** Ernest Newton & Co. Ltd., Holt St., Birmingham 7. **Birmingham N.E.:** H. Bryan & Son, 285 Slade Road, Erdington, Birmingham. **Eastern Counties:** Ernest Newton & Co. Ltd., Swardeston, Norwich. **Gloucestershire, Wiltshire & Somerset:** Ernest Newton (Western) Ltd., Charfield, Wotton-under-Edge, Glos. **Birkenhead & Wirral Peninsular:** J. Bennett, 67 Melwood Drive, Liverpool, 12. **Liverpool:** Turton & Melville Ltd., 22 Upper Duke Street, Liverpool, 1. **Derbyshire:** Shirley Factors Ltd., Ashbourne Road, Derby. **Wales:** Grooms Industries, Newtown, Mont., Carponents Ltd., 73 City Road, Cardiff. **Scotland:** Charles Tennant & Co. Ltd., 214 Bath St., Glasgow, C.2. **Ireland (Northern):** Turtle & Aird Ltd., 10 King Street, Belfast. **Ireland (Eire):** Edward Foley & Son Ltd., 63 South William Street (off Exchequer Street) Dublin.

A Member of the Tennant Group of Companies

ENGLISH ELECTRIC LOCOMOTIVES FOR BRITISH RAILWAYS

3,300-H.P. A.C. Units Weigh 73 Tons

OF the 100 3,300-h.p. a.c. locomotives ordered by British Railways in conjunction with the London—Crewe—Manchester and Liverpool electrification scheme, a total of 15 is being currently supplied by the English Electric Co., Limited. These locomotives, some of which are already in service, are under construction at the Vulcan Foundry, Newton-le-Willows, Lancashire. Fundamentally all the 100 locomotives will be of the same type, but 95, classified as type A, will have a top speed of 100 m.p.h. and the remaining five classified as type B will be limited to 80 m.p.h. and will be used primarily on heavy freight duties. This difference is simply a matter of varying the driving gear ratio, and so far as the English Electric batch is concerned three locomotives will have this lower ratio.

Although all the locomotives are basically similar, the various manufacturers are providing equipment of their own design and the external styling will be sufficiently different to make them readily distinguishable. Certain features are however standardised throughout, including a common driving cab and layout to ensure similar driving techniques. All also have two Faiveley pantographs, interlocked with the main earthing switch to give isolation and earthing of h.t. equipment when necessary. Similarly all the locomotives have four motors of the series wound d.c. type, permanently connected in parallel, and are fitted with an independent straight air brake.

In common with the multiple-unit stock all the locomotives will be fitted with A.P.C. to give automatic operation of the main circuit breaker when approaching a neutral section, and selection of the appropriate main transformer primary connection, depending on line voltage after passing through a neutral section. The auxiliaries vary in accordance with the methods used by the manufacturers, and this together with certain structural differences has resulted in a certain variation in weight and dimensions. For example, the English Electric machines have a total weight of 73 tons compared with 76.5 tons for those built by the G.E.C. and North British Locomotive Company, and whereas the former have a measurement of 30 ft. between the bogie pivot centres, the latter are 29 ft. 6 in.

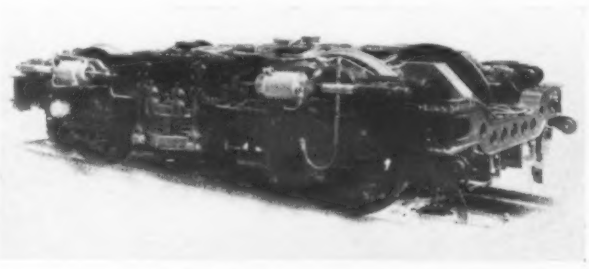
One of the new English Electric 3,300-h.p. a.c. electric locomotives for British Railways in the modernised surroundings of London Road Station, now Manchester Piccadilly

English Electric Specification

As with all the locomotives of type A and B the English Electric locomotives have a Bo-Bo wheel arrangement, two driving cabs and are equipped for dual voltage operation, either at 25 kV or 6.25 kV. The gear ratio is 76 to 25 for the 12 express machines and 76 to 20 for the three that are intended for freight working. The accelerating tractive effort is 40,000 lb., and the continuous rated tractive effort at 55 m.p.h. is 20,000 lb. Fourteen of the locomotives will have ignitron rectifiers and one will be fitted with air-cooled silicon rectifiers, rheostatic braking and a notchless form of control gear employing transductors.

The locomotive frame and body is fabricated as a unit stress-bearing structure in Cor-Ten steel. The underframe is a shallow cellular construction of light gauge members, plated top and bottom to form a closed unit. The side frames are of girder design and both exterior and interior skins are provided to give maximum torsional rigidity to the underframe and side frames. The roof between the two cabs can be removed completely to permit the removal and installation of electrical equipment, and since this precludes structural ties, any resulting weakness has been compensated for by making the side frames exceptionally rigid.

The bogies are designed for minimum maintenance with the operating gear arranged externally in order to facilitate maintenance. Care has been taken to ensure good riding by providing long-range spring gear, swing bolsters and close guiding of wheel and axle sets. The superstructure is insulated from the bogies by rubber at the centre pivots, side bearers and traction links. The more usual friction plates in the bolster are dispensed with, the braking and transmission thrusts being transmitted by two links between the bogie frame and bolster. The bogie side frames, transoms and headstocks are of fabricated box section construction and are riveted together.



Power bogie of the new locomotive

Electrical Equipment

The four traction motors are four pole d.c. machines that drive the road wheels through S.L.M. resilient drives. Class H insulation is provided for both the armature and field windings, and a single stage of field weakening is obtained by field tapping. The ignitron rectifiers are connected in two three-wire bridge groups and the two traction motors of each bogie are permanently connected in series across a bridge. Locomotive speed control is effected by on-load tap-changing on the transformer secondary, and in addition further control is effected by weakening the fields of the traction motors by field tapping.

The main transformer has an additional winding for train heating, and another for auxiliary supplies. Three-phase supply is obtained from an Arno convertor, mechanically coupled to a d.c. generator and a small tachometer alternator. In addition to the d.c. machines there are a.c. machines such as radiator fan motors and oil pump motors driven from the three-phase 50-cycle a.c. supply provided by the Arno convertor. On the locomotive there are two rectifier cubicles each containing four sealed ignitrons connected as a bridge circuit. The ignitrons are water-cooled units and a water jacket with spiral guides surrounds the vacuum vessel. Thermostats ensure that the water heaters are switched on and load application is prevented below the correct operating temperature.

At present the English Electric Company is engaged in building diesel locomotives of all five principal main-line types ordered by British Railways. Experimental work with gas turbine propulsion has also reached an advanced stage, and a 2,500-h.p. unit with direct mechanical drive is at present under construction at Newton le Willows.

This Saturday (October 8) sees the cessation of tramway operation in Sheffield and the end of such scenes as this in that city

General view of London Transport's Upminster Railway Depot, District Line, at night.

General view from the lighting tower at the west end, showing the car examination shed on the left with the lifting shop in the centre and stabling sidings on the right. In the background is the second lighting tower, with local lighting at its base. The row of short posts by the walkway in the centre of the picture carries talk back loudspeakers.

The signalling material for this depot was supplied by:

WESTINGHOUSE

Westinghouse Brake and Signal Co. Ltd., 82 York Way, London, N.1

Saxby & Farmer (India) Private Ltd., Calcutta — McKenzie & Holland (Australia) Pty., Ltd., Melbourne

Agents:—Bellamy & Lambie, Johannesburg — Westinghouse Brake & Signal Co. S.A. (Pty.) Ltd., Johannesburg.

THE
HISTORY OF WAGONS-LITS
1875–1955
by
George Behrend, M.A., F.R.G.S.

A new 32-page book, giving an excellent descriptive picture and historical background of this famous international company, covering a period of eighty years and containing 32 illustrations and line-drawings.

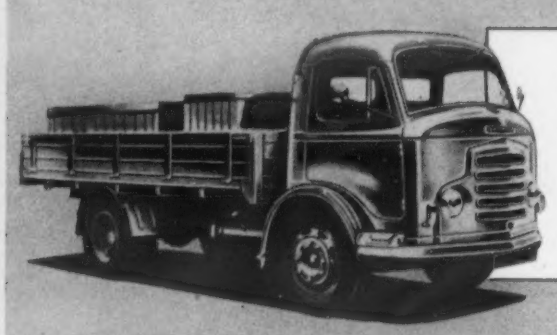
Price 3s. 6d.

Order your copy now from your bookseller or direct from the publisher.

Modern Transport Publishing Co. Limited
3–16 Woburn Place, London, W.C.1

BUILT STRONGER
TO LAST LONGER

THE universally acclaimed Commer range of petrol or diesel-engined vehicles offers the discriminating transport operator a wide choice of high-quality vehicles, from the small and attractive 'Cob' van to the massive 12 ton tractor-trailer.



THE Karrier range of specialised and well-proved municipal and industrial vehicles—petrol or diesel-engined—has for long enjoyed a world-wide reputation for unsurpassed value and long-lived reliability.

COMMER · KARRIER

PETROL or DIESEL for loads up to 12 tons

BACKED BY ROOTES COUNTRY-WIDE PARTS & SERVICE ORGANISATION

COMMER CARS LTD | KARRIER MOTORS LTD. LUTON BEDFORDSHIRE EXPORT DIVISION: DEVONSHIRE HOUSE PICCADILLY LONDON W.1

NEWS FROM ALL QUARTERS

Isle of Man Railway Closure

Sheer necessity, says the Isle of Man Railway, has forced it to close the Peel—St. Johns section of line (three miles long), but only for the winter.

From Trams to Television

A disused Aberdeen tram depot at Queens Cross is being disposed of to North of Scotland Television for use as a studio.

Fork-Lift Truck from Ford

The U.S. Ford Motor Company is marketing a fork-lift truck under its own name in America. It is a 4,000-lb. model with either petrol or diesel engine and is the result of collaboration with Tractor-Mate, Incorporated, of Michigan.

Even More Tourists in Britain

More than 333,570 overseas visitors came to Britain in July. This figure was 17 per cent higher than in the same month last year and brought the total number of arrivals during the first seven months of 1960 to 990,480—an increase of 19 per cent on the same period last year.

Aberford By-Pass on A.1

The Minister of Transport has authorised the letting of a contract to the Dowsett Engineering Construction Co., Limited, for the building of a 2½-mile long by-pass to Aberford village, near Leeds on the A1 in the West Riding of Yorkshire. Eventually the new road will link the nearly completed Micklefield by-pass with the trunk road between Aberford and Wetherby, which is scheduled for improvement.

U.K. Road Plans Derisive

Reporting back from a five-day 2,000-mile tour of Stockholm and two West German cities by 20 members of the all-party roads study group of M.P.s as guests of the Roads Campaign Council, Mr. G. Strauss, M.P., states that in many European countries there is a far greater determination to deal drastically with the traffic problem than there is in Britain. Stockholm, for example, plans to spend £8 per head of its one million population between 1960-80. London, with a 10 million population, spent 10s. per head in 1959. Also, in the first six months of 1960 new car registrations were up in Birmingham by 41 per cent, in Bradford by 45 per cent and in Leeds by 44 per cent compared with the same period of 1959.

More Channels for Mobile Radio

Further channels for v.h.f. mobile radio transmissions have been devised by the Mobile Radio Committee in its fourth report recently approved by the Postmaster-General. Earlier the committee had drawn up a programme for reducing the width of channels in the low band to 25 kc/s; now the same channel width is to be adopted as standard for the high band (165-173 mc/s). This will produce 90 more channels in the high band during the five-year changeover period specified in the fourth report. The committee has also revised the distribution of high-band channels among the various categories of users. The changeover to 25 kc/s channelling in the high band is due to commence on January 1 next for existing licensees.

Apprentice Training School at Swindon

A training school for apprentices is being built by the Western Region of British Railways at Swindon. It will provide for an intake of approximately 150 apprentices yearly.

Simca Split-Up

Proposed in May last, the split up of the French Simca company into two separate firms is now formally approved by two general constitutive meetings. One of the new companies will produce cars and the other commercial and industrial vehicles.

U.S. Diesel Locomotives for U.A.R.

A $22.5 million credit to finance the purchase in the United States, by the Government of the United Arab Republic, of 100 General Motors diesel-electric locomotives, with spares and workshop tools, has just been granted by the Export-Import Bank of Washington.

Transport Survey in East Pakistan

A major survey of transport facilities in East Pakistan is being undertaken by a United States International Co-operation Administration mission, at the request of the Pakistan Government. The year-long survey will comprise a comprehensive study of existing transport facilities on which to base a master plan for the future improvement of land, waterway and air transport.

Rootes Factory in Scotland

A new and smaller Hillman car is to be made in Scotland by the Rootes Group at a factory adjacent to that of the Pressed Steel Co., Limited, at Linwood in which the bodies will be made. The two companies are spending £22 million on the project and in addition the Rootes group expects to spend another £15 million in 1961-62 on other development projects in the group.

Severn Bridge to be Commenced

Tenders are now being invited for the first contracts on the Severn Road Bridge and this means, says the Minister of Transport, that work will start shortly on the £16 million project, due to be completed in 1965-66. The scale of tolls to be levied on users will be announced in due course. The final design of the bridge is still being considered by the Royal Fine Art Commission. The initial tenders will be for the bridge foundations and substructure and the access roads.

Pullman Diesel to Stop at Bath

A study of the new Pullman diesel services recently introduced by the Western Region has revealed that as the loadings of the morning and evening Bristol Pullman are lighter than originally anticipated it is possible to re-route these trains via Bath. As a result, commencing on October 17 and continuing experimentally on Mondays to Fridays until further notice, the 7.45 a.m. from Bristol to Paddington will be retimed to start at 7.40 a.m., calling at Bath at 7.57 a.m., arriving Paddington at 9.35 a.m. as at present. In the return direction the 4.55 p.m. from Paddington will call at Bath at 6.32 p.m. and arrive Bristol at 6.50 p.m.

THE STAR OF THE SHOW

Visitors to the Commercial Motor Show saw a revolutionary design of road tanker in the B.P. colours. The Autotanker is an eight wheel, chassis-less vehicle with stressed tank unit containing six compartments designed for 24 ton gross rating.

It is an all aluminium structure combining tank-body, cab and chassis all in one unit, the engine being mounted at the rear. The body is 2 ft. lower than the conventional tanker and the low centre of gravity gives excellent road holding.

TBT/6

JOHN THOMPSON GROUP

THOMPSON BROTHERS (BILSTON) LIMITED
BRADLEY ENGINEERING WORKS · BILSTON · STAFFORDSHIRE
Telephone: BILSTON 412648 Telegrams: THOMPBROS, BILSTON

COMMERCIAL AVIATION

Britain to Raise Landing Charges

LONDON—VANCOUVER

THE Minister of Aviation, Mr. Peter Thorneycroft, has informed the airline operators of his intention to increase the landing fees at State-owned civil airports in the United Kingdom as from April, 1961. The new scale of fees, which should broadly increase earnings from this source by a third, will, he considers, substantially reduce the deficit arising from the provision of these airports and their facilities. (Editorial reference page 1.)

B.O.A.C. Comets' Second Anniversary

It is two years since B.O.A.C. opened the world's first pure jet commercial passenger service across the North Atlantic with simultaneous flights in both directions between London and New York by de Havilland Comet 4 jetliners on October 4, 1958. In those two years B.O.A.C. Comets have carried some 327,000 passengers more than 1,205,000,000 passenger-miles and have flown more than 27,000,000 miles in 68,500 hr.

T.C.A. Vancouver Service

Daily jet services from London to Vancouver which Trans-Canada Air Lines began on October 1 cut travelling time by more than 8 hr. This new DC8 jet service, which also includes Winnipeg on a daily basis, operates independently of connections and passengers are able to go all the way on the one aircraft, without changing en route. Two flights a week operate via Prestwick. Halifax, Nova Scotia, which has had direct service from London and Prestwick since April will be added to the T.C.A. Atlantic jet routes in January.

B.E.A. Pionairs Chartered to W.A.A.C.

Three aircraft from the Pionair fleet of British European Airways left London Airport on September 24 for Nigeria, where they will operate for the next month on charter to West African Airways Corporation during the tour of Nigeria by H.R.H. Princess Alexandra of Kent. The aircraft had been repainted in the colours of W.A.A.C. Each aircraft was fitted with 28 seats and full catering units ready for immediate use when the aircraft arrived. The aircraft retain their British registrations G-AGHJ, G-AGHZ and G-AKJH. They were flown by crews of W.A.A.C. and routed by way of Bordeaux, Casablanca and Villa Cisneros.

Pilots and Low Fare Services

With the introduction this month of new types of low fare air services the British Air Line Pilots Association has welcomed their advent as a further boost to expand the industry, but has stated that the pilots with the independent operators who will be operating these new services will be carrying out their duties as pilots under a sense of gross injustice. This is because they will be operating services on behalf of the State Corporations and the Corporations' pilots who would have flown the services are in receipt of one-third more in salary than the independent pilots. B.A.L.P.A. intends to continue its campaign to obtain the same rates of pay for all pilots who fly the same type of aircraft.

I.A.T.A. Technical Conference Next April

The 14th technical conference of the International Air Transport Association will be held at the Queen Elizabeth Hotel in Montreal beginning on April 17, under the chairmanship of Captain R. V. Carleton, vice-president of operations, Braniff Airways. The first week of the conference will be devoted to an intensive international symposium examination of supersonic aircraft. More than 500 engineers, operations experts, research scientists, economists and other interested specialists from airlines, various international organisations, governments, manufacturers and laboratories from virtually all parts of the world are expected to participate. According to the I.A.T.A. technical director, Mr. Stanislaw Krzyczkowski, the purpose of the symposium is to develop a clearer picture of the capabilities and limitations of supersonic aircraft, discuss how it can best be adapted to transport uses, examine its needs for airports, air navigation and other facilities, and assess some of its economic implications. Other subjects to be discussed among the airlines during the second week of the conference will include advanced techniques in aeronautical communication systems and a review of certain meteorological problems in the light of jet operational experience.

British Traffic in June

During June, 1960, capacity ton-miles offered by United Kingdom airlines on their scheduled services increased by 28.4 per cent and total traffic carried rose by 22.8 per cent; freight ton-miles increased by 9.8 per cent and mail ton-miles increased by 22.8 per cent. 657,658 passengers were carried, or 27.3 per cent more than in June, 1959, and these passengers travelled 405.6 million passenger-miles, or 26.5 per cent more. The overall load factor fell from 62.8 to 60 per cent. During the four-week period ended June 25 capacity operated on B.O.A.C. scheduled services went up by 30.4 per cent compared with the corresponding period in 1959—capacity on Western routes increased by 40.3 per cent and on Eastern routes by 18.9 per cent. Total traffic carried rose by 27.1 per cent on Western services and increased by 20.6 per cent on Eastern services. The total of 58,008 passengers carried by B.O.A.C. was 20.2 per cent more than during June, 1959, and these passengers flew 200.8 million passenger-miles, or 27 per cent more. The overall load factor dropped from 58.8 to 55.9 per cent. B.E.A. offered a total of 19.5 per cent more capacity on scheduled services in June, 1960, than in June, 1959; capacity on international services increasing by 18.7 per cent and on domestic services by 21.8 per cent. Total traffic carried rose by 16.9 per cent. 224,942 passengers, or 16.9 per cent more, travelled on international routes and 187,223, or 23.4 per cent more, travelled on domestic routes. The overall load factor fell from 67.7 to 66.2 per cent. The private companies operating in association with the Corporations provided 36.7 per cent more capacity ton-miles on scheduled services than in June, 1959; international capacity showing an increase of 31.9 per cent and domestic capacity showing an increase of 52.7 per cent. International freight traffic went up by 8 per cent while domestic freight rose by 85.6 per cent. Passengers carried totalled 182,951, or 51.8 per cent more, and these passengers flew 36 million passenger-miles, or 45.3 per cent more. There was an increase of 47.8 per cent in the number of passengers carried on international routes and an increase of 57.3 per cent on domestic routes. The overall load factor fell from 67.2 per cent in June, 1959, to 62.6 per cent in June, 1960.

PRESIDENT OF M.P.T.A.

Sidney P. Hill.

Alderman SIDNEY P. HILL

• • • • • •

Elected president of the Municipal Passenger Transport Association at last month's annual conference in Douglas, Alderman Sidney P. Hill, who has been chairman of the Nottingham City Transport Committee since 1951 and a member of the executive council of the M.P.T.A. for the past nine years has, as a railwayman since June, 1919, displayed always a keen appreciation of transport problems, a characteristic which has made his election all the more warmly acclaimed. Born in 1900 at the Leicestershire village of Scalford, near Melton Mowbray, he went nine years later to live in Nottingham, the city with which he is still associated. Educated at a council school, he left when he was 13 to work in a chemical factory but contrived two years later to join the Sherwood Foresters on the basis of his own statement that he was 19 years old. After serving in Ireland, France and in Germany with the British Army of Occupation he was demobilised in 1919 and thereafter entered railway service; he is still a locomotive driver on British Railways. Between the wars he was actively engaged in political work and, if that was not enough, he and Mrs. Hill ran a youth club for 10 years; he is at present honorary president of a local youth club. Following the 1939-45 war he was elected to Nottingham City Council in November, 1945, and in May, 1958, he was elevated to the aldermanic bench. A further civic honour was his appointment to serve as Sheriff of Nottingham for 1959-60. Among Alderman Hill's wide interests is the study of Esperanto and he has seized any available opportunities to travel using this international language. He hopes indeed to find opportunity for further practice when he attends the U.I.T.P. congress in Copenhagen next May.

C.I.E. RAIL PLAN

Final Network Settled

LAST CLOSURES ANNOUNCED

AN official announcement last week by Coras Iompair Eireann pointed out that the Irish Transport Act of 1958 placed on the board of C.I.E. the obligation to provide reasonable, efficient and economical transport services. The Act also authorised the board to substitute road for rail services when it was satisfied that the operation of rail services was uneconomic and that there was no prospect of their continued operation becoming economic within a reasonable period.

Shortly after taking office, the board initiated a survey of the railway network and its prospects. This survey had now been completed and the board had reached a conclusion as to the rail system which it believed would meet satisfactorily the needs of the public and which would fulfill the obligations imposed by the Act. To meet these the board was satisfied that the substitution of rail services by road services was necessary on the West Clare (3-ft. gauge), West Cork and Waterford—Tramore sections of the network. By making these substitutions it was estimated that C.I.E. would reduce the cost of working by approximately £80,000 per annum. Unless certain specific traffics for which negotiations were in hand were secured, the Macmine Junction—Waterford section and the Muineheag (Bagenalstown)—Palace East section must also be substituted by road services. It was the intention to effect these substitutions before the end of the financial year on March 31, 1961.

Programme of Consolidation

Except for some small stations, these were the final substitutions of rail services by road services which the board envisaged within the five-year period set out by the 1958 Act. It was also the intention to consolidate the existing lines and to continue to intensify efforts to provide a service both by road and rail which would serve satisfactorily the needs of the community. To this end, the board was continuing to modernise rolling stock on the railways, to improve its bus and lorry fleets and to carry through an extensive programme of mechanisation and modernisation of stations and depots to enable it better to co-ordinate its rail and road freight services.

The Waterford—Tramore section is isolated from the rest of the railway system and the West Cork section which was formerly the Cork, Bandon and South Coast Railway is isolated so far as passenger services are concerned but there is a freight line through the streets from its Cork station at Albert Quay to the main station at Glanmire. The main West Cork service operates between Cork and Bantry with connections at Clonakilty Junction for Clonakilty and at Drimoleague for the Skibbereen and Baltimore line. Occasional freight workings take place from Ballinascarthy on the Clonakilty branch to Courtmacsherry. The narrow-gauge West Clare is worked between Ennis on the Limerick—Sligo line and Moyasta Junction whence there are branches to Kilrush and Kilkree.

The lines which will remain are those from Dublin to Cork and Cobh, Mallow—Tralee, Cobh Junction—Youghal, Waterford—Mallow, Waterford—Clonmel—Limerick Junction—Limerick, Waterford—Rosslare, Thurles—Clonmel, Limerick—Tralee, Ballingrane—Foynes, Limerick—Roscrea—Ballybrophy, Limerick—Athenry—Claremorris—Collooney, Roscrea—Birr, Dublin—Wexford—Rosslare, Dublin—Mullingar—Athlone—Athenry—Galway, Mullingar—Collooney—Sligo, Athlone—Claremorris—Manulla Junction—Westport, Manulla Junction—Ballina, Attymon Junction—Loughrea, Kilfree Junction—Ballaghaderreen, Dublin—Dundalk, Portarlington—Athlone, Portlaoghaise—Kilkenny—Waterford, Kildare—Muine Bheag—Kilkenny and Howth Junction—Howth. Regular freight services are also worked between Clara and Banagher, Limerick and Rathluirc, Tralee and Castleisland, Bantur and Newmarket, Drogheda and Oldcastle, Drogheda and Ardee, and, less frequently, between Tralee and Fenit, Kilkenny and Castlecomer, Dublin and Kingscourt, Enfield and Edenderry, and Portlaoghaise and Mountmellick.

★

RAILWAY STRIKE THREAT

N.U.R. Action

DISSATISFIED with a pay offer for employees in British Railways engineering workshops, the National Union of Railwaymen, after a joint meeting with the Confederation of Shipbuilding and Engineering Unions to consider the Transport Commission's offer, decided to instruct its 330,000 members to stop work at one minute past midnight on Monday, October 17. Porters, shunters, guards, signalmen and some drivers and firemen will thus be on strike in addition to the shopmen.

After months of bargaining, the Commission has offered 3 per cent back-dated to January 11. Craftsmen would receive an extra 1 per cent from the date on which a settlement became operative. The unions have indicated their willingness to accept the offer on behalf of the 22,000 unskilled workers. But they are insisting on a further rise of up to about 2 per cent for 88,000 skilled and semi-skilled men.

Further Discussions

The action of the N.U.R. did not meet with enthusiastic approval from the Confederation of Shipbuilding and Engineering Unions which on October 3 decided to suggest that a further meeting he sought with the B.T.C. The point had been made by Sir Brian Robertson that such a strike would have a disastrous effect upon the railways just at a time when they were improving their efficiency and gaining traffic and that union members were being called out when their wages and conditions were not in dispute. This seems to have impressed the confederation when it met in Scarborough.

On October 4, following a meeting of the N.U.R. executive committee, it was announced that Sir Brian had been asked to meet union leaders representing the 110,000 railway shopmen and that he had agreed so to do. Mr. S. Greene, general secretary of the N.U.R., said that as the Commission's last pay offer was described as "final" the union was doubtful whether any purpose would be served by another meeting, but did not want to show disrespect or disunity and so was prepared to join in asking for such a meeting. It agreed with Sir Brian that a strike would have a disastrous effect on the railways just when they were improving in efficiency and gaining traffic. Only a definite settlement on pay would make the N.U.R. withdraw its strike notice.

PRESENT STATE OF RAILWAY ELECTRIFICATION

*6—Further Developments Abroad**

By F. J. G. HAUT, B.Sc.(Eng.), A.M.I.Mech.E.

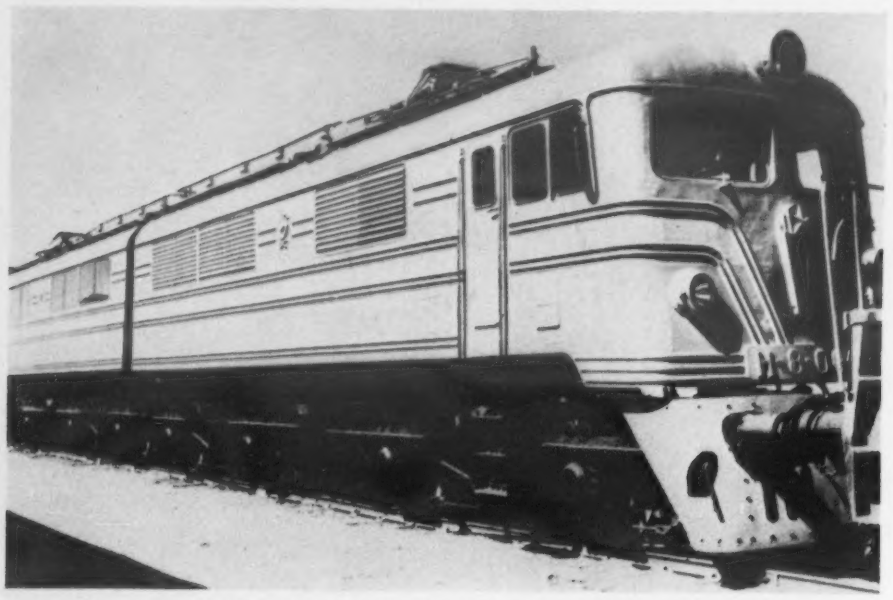
IMPORTANT examples of extensive electric railway working are provided by the private lines of Switzerland which include the internationally important Berne — Lötschberg — Simplon line and such difficult railways as the metre-gauge Rhaetian line covering the mountain districts and passes of the Grisons. The almost complete electrification of Switzerland's railways is of course a well-known fact. Starting with the idea of using the country's water power and making it independent of foreign fuel supplies, it developed into a railwayman's paradise where even the smallest lines have brand-new equipment and far from being closed down, give one the impression of a young and vigorous industry. This latter fact is to me the most interesting one. While we shut down branch lines as "uneconomic" and for lack of patronage, usually leaving the communities with half-hearted coach and parcel services, here we see these small lines with new and costly equipment providing transport of a quality which is astounding. I am only going to describe one of these lines, the Jura Railway, serving a populated and hilly district. This example is chosen quite at random; there are literally dozens of such lines.

From 1952 onwards, seven small existing lines, serving the mountain area of the Jura, were grouped into two undertakings and electrified with 1,500-volt d.c.; they are all metre gauge. They all have heavy gradients, continuous often with 1 in 40 and rising to 1 in 20 for short distances. There is a substantial commuter traffic bringing workers to La Chaux-de-Fonds, and there is tourist traffic at weekends; goods traffic consists of local deliveries and a certain amount of timber traffic. Also, one standard-gauge main line is included, connecting with the main system at Porrentruy and electrified with standard Swiss a.c. The following units were ordered:

(1) Two single-phase locomotives for the a.c. sections.
(2) Five d.c. motor coaches with three driving trailers.
(3) Eight d.c. motor coaches.
(4) Three goods motor vans.
(5) Six driving motor coaches.

The central part of the goods motor van is used as luggage and parcel compartment; the machinery being installed at both ends with two drivers' cabs. The vehicles can haul 80 to 160 tons according to the gradients of the line. The two bogies have two motors each, nose-suspended and transmitting power in Secheron link drives. The vehicles weigh 36 tons and are 12 metres in length. The new equipment has helped to gain more business; they have now worked for up to seven years without any difficulties.

Russian Co-Co locomotive of Series VL23

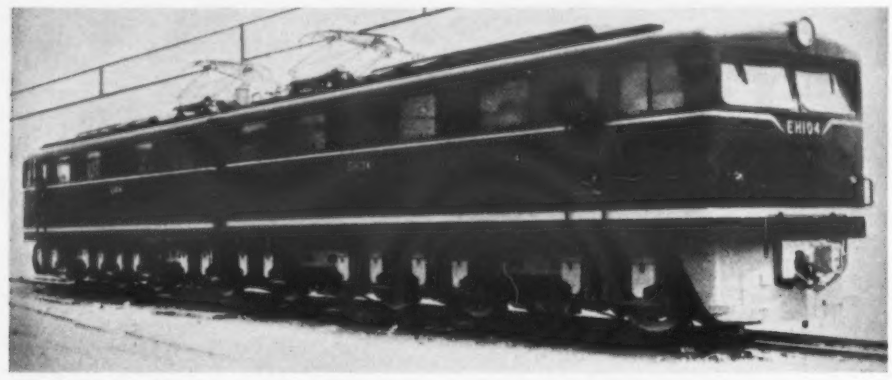


Russian Bo-Bo+Bo-Bo unit of Class N8 for 5-ft. gauge

The position of electric traction in the U.S.A. is very peculiar. After being among the pioneers, some important systems followed, mostly mountain lines and commuter traffic and including the important New York—Washington link of the Pennsylvania Railroad. The early enthusiasm and interesting designs on these systems (Chicago, Milwaukee and St. Paul; New York, New Haven and Hartford; and New York Central Railroad, among others) were not followed up and today U.S.A. electrifications are really all old-fashioned and expensive to run. The fact is, that the U.S.A. turned to diesel traction with a hope of reviving the railways. To a large extent this has failed, especially as many of the existing class 1 railways compete with one another; although amalgamations are now suggested, the American public is car, road and air conscious, and considers the railways as something which will soon be on the scrapheap.

This atmosphere of impending doom hardly encourages the spending of large sums on new equipment. A number of interesting locomotives has, however, been developed in recent years and one

(*Continued on page* 14)



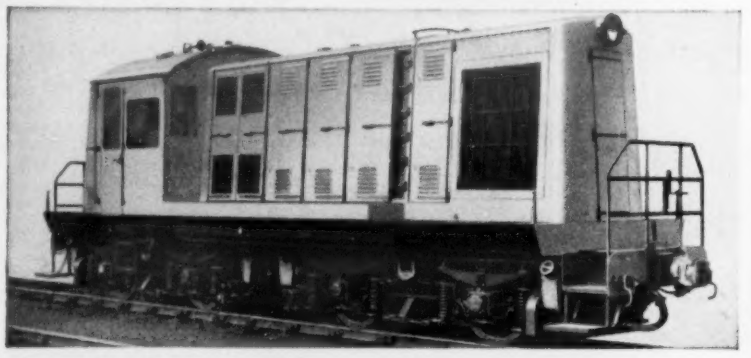
A Japanese 3 ft. 6 in. gauge Bo-Bo+Bo-Bo type of the EH 104 series

RECENT RUSSIAN ELECTRIC LOCOMOTIVES

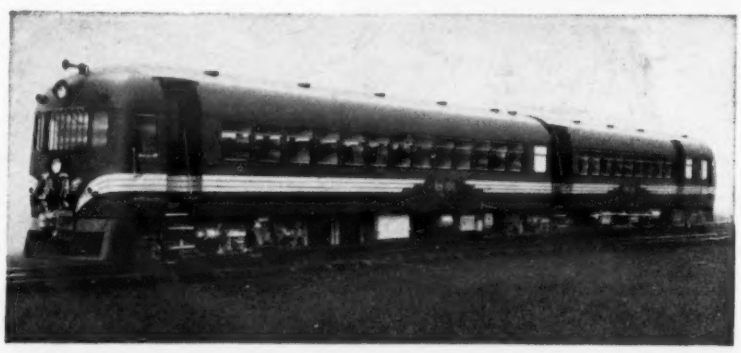
Series	VL.22	VL.23	N.8	P.F.	G.F.	G.R.F.
Year built	1938	1955	1951	1959	1959	1959
Wheel arrangement	Co-Co	Co-Co	Bo-Bo+Bo-Bo	Co-Co	Co-Co	Co-Co
Current	3,000-volt d.c.	3,000 volt d.c.	3,000 volt d.c.	25 kV, s.ph. a.c.	Co-Co	Co-Co
Length overall (m/m)	16,390	17,020	27,520	23,060	23,060	23,060
Wheel diameter (m/m)	1,200	1,200	1,200	1,250	1,220	1,220
Total weight (tons)	132	138	180	126	138	138
Hourly power output (kW)	2,030	3,060	4,100	4,270	4,270	4,270
Hourly speed (km.p.h.)	30/37	42.6	42.6	74	46	46
Hourly tractive effort (kg.)	24/20,000	26,400	35,200	21,000	33,000	33,000

COMMONWEALTH RAILWAYS OF AUSTRALIA
955 H.P. Diesel-Electric Locomotive (10 Ton Axle Load)
In collaboration with Sulzer Bros. (London) Ltd. and Crompton Parkinson Ltd.

BRITISH RAILWAYS
Three Unit Diesel Mechanical Railcars



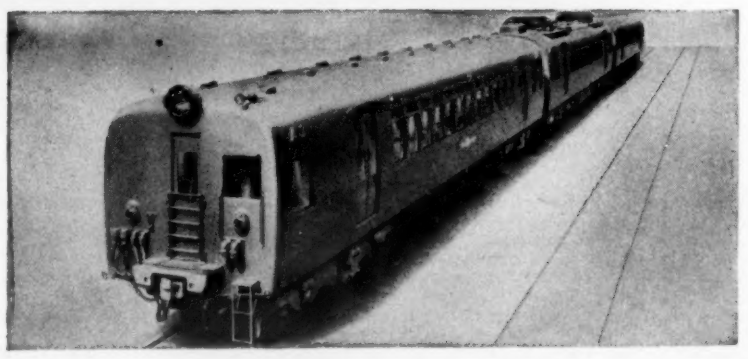
GHANA RAILWAYS
400 h.p. Diesel Electric Locomotive



NEW ZEALAND GOVERNMENT RAILWAYS
Twin Articulated Diesel Mechanical Railcars
In collaboration with The Drewry Car Co. Ltd.

BRITISH RAILWAYS
1,160 H.P. Diesel-Electric Locomotive
In collaboration with Sulzer Bros. (London) Ltd. and Crompton Parkinson Ltd.

SANTOS JUNDIAI RAILWAY, BRAZIL
3,000 Volts, 800 H.P. Three Car Train
In collaboration with The English Electric Co. Ltd.



THE BIRMINGHAM RAILWAY CARRIAGE & WAGON CO·LTD
Smethwick
TELEPHONE SMETHWICK·1881
TELEGRAMS 'CARRIAGE SMETHWICK

* No. 5 appeared October 1.

MODERN AIRWAYS and COMMERCIAL AVIATION SECTION

S.A.A. BOEING SERVICE STARTS

Four Flights Weekly in Springbok Partnership

SHORTLY after 10 a.m. on Sunday, October 2, the first service of South African Airways to be operated officially with a Boeing 707 landed at London Airport from Johannesburg. There had actually been previous flights scheduled for DC7Bs but actually flown with Boeings. Last Sunday was, however, the occasion with a passenger list which included Mr. D. H. C. du Plessis, general manager of South African Railways, Harbours and Airways, Dr. J. H. Botha, South African Railways Commissioner, and Mr. F. W. Liebenberg, representing the Secretary for Transport, and their wives. Also on the list were the Mayors and Mayoresses of Durban, Bloemfontein, Pretoria, Salisbury and Nairobi, the Mayoress of Johannesburg, and Mrs. J. Newton Thompson, the Mayor of Cape Town.

The South African Airways Boeing 707-320 "Cape Town" which formally inaugurated the Johannesburg—London jet service of the airline is here seen above its nameplace

Two at Work

South African Airways ordered three Boeing 707-320s and two of these have been delivered—the third is expected in January. The two aircraft are scheduled to maintain four flights a week in each direction between Johannesburg and London. Three call at Salisbury, Nairobi and Rome and each makes one additional stop in Europe at Athens, Zurich or Frankfurt. The fourth service follows the west coast route although its landing at Brazzaville is for technical purposes only. Thereafter it continues to London via Rome and Amsterdam. The services are, of course, flown in conjunction with B.O.A.C., Central African Airways and East African Airways. Names given to the three aircraft are *Cape Town, Durban* and *Johannesburg* and the first-named operated the inaugural service.

The South African Airways aircraft have an interior decor designed by Walter Dorwin, Teague and Company, New York. It consists of pale rose ceilings and light pastel greys and greens are used for the seats. Coral, gold and pink wall murals feature South African wild life and the protea, the national emblem. The seating arrangement consists of 32 first-class seats in pairs each side of the aisle and 93 tourist-class seats in groups of three each side of the aisle. There are five lavatories and a washroom.

The crew numbers 11, made up of a senior captain, a co-captain, first officer, navigator, flight engineer, radio operator, chief flight steward, senior flight steward, two stewards and a hostess. Cargo space is double that of the DC7Bs previously used on the Springbok Service and it is thought that this could lead to entirely new export and import enterprises, because highly perishable freight can be accepted for delivery in London or Johannesburg within a little more than 12 hours.

Externally, the symbol of the flying springbok still makes a South African Airways aircraft easy to recognise anywhere.

General Particulars

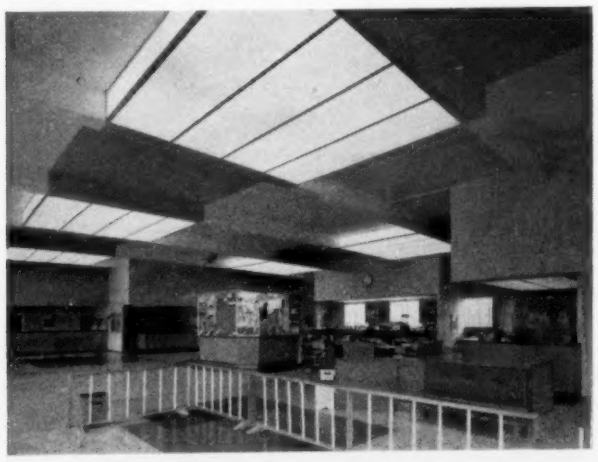
Fuselage length	152 ft. 11 in.
Height	41 ft. 5 in.
Maximum take-off weight	302,000 lb. (151 tons)
Maximum landing weight	195,000 lb.
Wingspan	142 ft. 5 in.
Payload	31,800 lb.
Capacity of cargo holds	1,400 cu. ft.
Maximum speed	600 m.p.h. at height of between 35,000 to 40,000 ft.

In all, South African Airways has committed itself to an investment of £10 million for its jet fleet, new hangar, test houses and other facilities necessary for their jet service.

New Manston Passenger Building

COPING WITH INCREASED TRAFFIC

THE traffic on inclusive tour and scheduled passenger services operated by Silver City Airways increased so greatly the number of passengers using Manston Airport during the summer that a new passenger terminal building was brought into use. In summer months it also handles passengers on the London—Paris Silver Arrow service, the rail-air-rail route operated jointly by Silver City in conjunction with British and French Railways, and the refreshment facilities are also available to users of the vehicle ferry between Manston and Ostend.



Interior of the recently-opened passenger building at Manston Airport

Occupying a large square brick building, the new terminal has ample accommodation for passengers and their friends, with chairs and tables taking up the entire central area, with an assembly bay in one corner. Around the walls are the reception counter, banking facilities and the cafeteria and bar, and there is a bookstall in the centre of the public space. Lighting for all the operations carried on in the building is provided by several large areas of the Lumenated Ceiling lighting system. This method of lighting, in which a number of fluorescent tubes is concealed by strips of translucent corrugated plastics supported in a lightweight metal track, prevents glare and spreads the light evenly over a wide area. In effect, the entire 1,249 sq. ft. of the Lumenated Ceiling acts as a light source, so that shadows are almost eliminated and the illumination is comfortable and well diffused. Each of the counters around the central area has an additional area of Lumenated Ceiling to provide a higher level of illumination in these places. Main contractor for the new terminal was C. Jenner and Sons, Limited, Folkestone, and the electrical contractor was John Hawkes, Walmer. Lumenated Ceilings, Limited, supplied its own materials and also carried out the installation thereof.

An addition to the Ford Film Library is a new instructional film "Power Train." This colour film, in animated cartoon form, traces the progress of two prehistoric men in pursuit of a means of transport. Amused by their antics the viewer is given a lucid and diagrammatic explanation of the intricacies of the clutch, gearbox and differential of a car transmission system. This is the second film in the series commenced with "The Story of the Motor Car Engine" and Ford is planning a third covering steering and braking.

The Chilean State Railways has called for tenders for 113 diesel-electric or diesel-hydraulic locomotives. For the 3 ft. 6 in. gauge, 29 locomotives of 1,200 h.p., nine of 600 h.p., and 12 of 400 h.p., are required; and for the 5 ft. 6 in. gauge, 10 of 1,600/2,000 h.p., 49 of 600 h.p., and four of 400 h.p. Further details may be obtained from the Departamento de Tracción y Maestranzas, Ferrocarriles del Estado de Chile, Avenida B. O'Higgins, 934, Santiago de Chile. The closing date is October 28.

NOW! SUPER POWER FOR THE SUPER COMET

The tempo of road transport is speeding up. To meet the increasing demands of a motor-way age, Leyland's famous 9-ton Super Comet is now fitted with a new 'Power-Plus' 6-cylinder diesel developing 125 h.p.
This new development, together with the vehicle's other features — 5-speed gearbox with optional overdrive, hub-reduction rear axle, superb diaphragm-operated, cam-type air brakes and luxury cab — makes the Super Comet the greatest combination of power, economy, performance and safety in the 9-ton payload class.
And, though the Super Comet is a quality-built job, having the wonderful reliability and long life which are traditional of every Leyland, it still sells at a price which is the envy of all its rivals.

fitted with POWER PLUS Series 400S. Diesel

Leyland
FOR POWER PLUS ECONOMY.

LEYLAND MOTORS LTD • LEYLAND • LANCS
Sales Division: Hanover House, Hanover Square, London, W.1. Telephone: MAYfair 8561

"ALHAMBRINAL"

INTERIOR DECORATIVE PANELLING FOR TRANSPORT

"ALHAMBRINAL" is the modern, highly decorative permanent interior panelling. It is produced in a wide variety of designs and colours and is used for ceiling linings, under-racks, body panels, seat backs, etc., in motor coaches, buses, trolley buses, tramcars, railcars and railway carriages.

TT

LITERATURE ON REQUEST

We will be glad to send you without obligation a booklet containing fuller details of the products mentioned in this advertisement. Samples are also available.

MANUFACTURERS OF
★
ALHAMBRINAL
DECORATIVE PANELLING
★
EXTERIOR ROOFING
(SUPERFLEX)
★
PROOFINGS
(ON FLAX, COTTON OR JUTE)
★
TARPAULINS, COVERS AND SHELTERS

Contractors to the Admiralty, War Office, Colonial Governments, Home and Foreign Railways, Steamship Companies, etc.

THOMAS THOMSON
SONS AND COMPANY (BARRHEAD) LIMITED
TELEPHONES: BARRHEAD 1038/9
FERENEZE WORKS
BARRHEAD, near GLASGOW
TELEGRAMS: 'WATERPROOF' BARRHEAD

Present State of Railway Electrification

(*Continued from page 12*)

of these is described as a characteristic development. The Virginian Railroad, which between Roanoke and Mullens (134 miles), runs an electrified line with heavy gradients (1 in 50) and very heavy freight and coal traffic, acquired in 1956-57, 12 rectifier-equipped locomotives which take 11,000 volt single-phase a.c. of 25 cycles from overhead lines and use it in standard d.c. motors.

On the Virginian

The locomotives, which look like a diesel shunter, have two three-axle bogies. The rectifiers are 12 12-in. ignitron rectifier tubes with their associated firing circuit apparatus. Four iron-core reactors are located between the rectifiers. The smoothing reactor is an iron-core, two-coil type, and is used in the motor circuit to suppress the ripple current in the output of the rectifier tubes. It is of the dry type, forced-air cooled, insulated for operating voltages in excess of 2,000, and carries the current of three motor circuits.

Single-phase a.c. power is fed through the pantograph to the transformer. Voltage on the transformer secondary is varied by means of the tap switches; the current passes to the ignitrons which are arranged three in a group, bridge connected. Rectified power flows from the tubes through a smoothing reactor to the six traction motors. These are series-wound axle-hung d.c. motors of the type normally used on diesel-electric locomotives. From Clark's Gap eastbound to Roanoke two units handle a 9,000-ton train against a ruling grade of 1 in 172 (0.58 per cent). Westbound, from Roanoke to Mullens, two units handle an empty train of 3,844 tons (approximately 162 cars). The weight, fully loaded is 174 tons, and on each axle is 29 tons. The length inside knuckles is 69 ft. 6 in. and the total wheelbase 52 ft. 9½ in. The rigid wheelbase is 13 ft. and the distance between centre plates 45 ft. The wheel diameter is 40 in. The output (continuous) is rated at 3,300 h.p.

Japan

Japan is another interesting example of recent developments in electric traction and how these can help to retain and run increased traffic. Until recently the Japanese State Railways (which is mostly of the 3 ft. 6 in. gauge) electrified a number of lines with 1,500 volt d.c., including the most important Tokaido line from Tokyo to Kobe; it carries about a quarter of all traffic and 120 trains each way daily. The 1,500-volt routes are to remain and even to be extended, but experiments with 50-cycle traction started in 1955 and now four lines, totalling over 300 miles, are to be electrified with 20,000 volt, single-phase a.c. at 50 or 60 cycles. Some 19 locomotives have been built and 32 further units using mercury arc rectifiers have been ordered. In addition, the Tokaido line is to be duplicated in 4 ft. 8½ in. gauge and also to be electrified with the new system.

Electrification of railways, together with a general industrial awakening, is also coming to the countries behind the Iron Curtain, where countries so far interested in electrification are Hungary, Czechoslovakia, Poland, Yugoslavia and, of course, Russia. Readers will appreciate that information, especially on latest developments, is hard to come by and has to be "pieced together" from rather secondary sources. I therefore cannot vouch in any way for the accuracy or completeness of the details given. Dealing first with Hungary, we have already heard that it was one of the pioneers of 50-cycle traction and had some fine engineers in the past who worked in well-equipped factories. The line electrified in 1932-34 from Budapest to the Austrian frontier was never extended, and in spite of all sorts of plans further developments were rather modest, mostly probably because of the war and political upheaval. A small number of new locomotives was built. These are extremely interesting designs, using a phase and frequency converter system (illustration September 3).

Czechoslovakia

Czechoslovakia had its main stations in Prague and approach lines electrified many years ago. These remained isolated but recently plans were announced for substantial electrifications consisting of two main lines of 166 and 164 km. respectively, changing from the original 1,500 volts to 3,000 volts d.c., and an interesting locomotive of the all-adhesion 0-4-4-0 type was developed. This locomotive follows closely recent Swiss practice.

These locomotives are to haul 720-ton express trains at 74 m.p.h. and 1,440 tons goods trains at 35 to 55 m.p.h. The type was developed by the former Skoda Works together with Sécheron of Geneva. The locomotive has a self-supporting, all-welded steel body with welded bogies. Tractive forces are transmitted by the bogie to the locomotive body by means of a rocking beam; motor power is transmitted by a Sécheron disc and link system. The electrical part is the standard one for d.c. locomotives; the four motors are of the series-wound six-pole non-compensated type. The 1-hr. rating is 586 kW at 600 r.p.m. There is an electro-pneumatic control system. In the first instance 23 locomotives were ordered and a further order is to be placed later.

Poland and Yugoslavia have announced electrification plans and a number of locomotives has been built. Before the war Poland was concerned in electrification around Warsaw and in 1937 English Electric supplied the electrical equipment for 76 800-h.p. three-coach trains and for 800 h.p. locomotives for the suburban services. Current used was 3,000 volts d.c. After the war, further equipment was bought to make good wartime losses, and further contracts were awarded to English Electric Company, and to Metropolitan-Vickers, and European countries, including also 2,120-h.p. locomotive equipment, and a number of units for three-coach trains. The Warsaw lines were reconstructed and plans laid for the electrification of the Gdansk—Gdynia line.

Czechoslovak Bo-Bo locomotive of E499 series on a freight train

Soviet Union

In U.S.S.R. substantial schemes have already been carried out and big plans have been announced for the future. The first electrified line was near the Black Sea (Baku—Sabuntschi with 1,200 volts); a number of lines was converted radiating from Moscow, using motor coaches and built by foreign contractors, including Metropolitan - Vickers. Before the recent war Russia bought a number of electric locomotives in Europe, all for heavy goods traffic and of the C-C type. In the late thirties, plans for special factories for electric locomotives were announced and since the end of the war we have received news of a number of types of electric locomotives for 3,000 volt d.c. Some of these are tabulated on page 12.

Among the first 3,000-volt lines to be electrified was a line in the Ural mountains, Kiel to Sverdlovsk with very heavy goods traffic. The locomotives are all of Co-Co types; they were built in Italy, U.S.A. and Russia. There are six nose-suspended motors giving 2,720 h.p. at 1-hr. rating. Weights vary between 120 and 130 tons and the maximum speed is 100 km.p.h. (62 m.p.h.).

Further substantial electrifications followed and by 1957 3,526 miles were under 3,000 volts d.c. and 313 miles were under 1,500 volts d.c.

Experimental 50-Cycle Line

An experimental line, using 50 cycle a.c. at 20,000 volts, was also built—85 miles long. The lines electrified at that date were the suburban areas of Moscow, Leningrad and Baku, the Transiberian Railway, lines in the Urals, Arctic, and Don Basin and in the Caucasus. It is obvious lines with heavy goods traffic and in mountain regions received preference. Plans have been announced to electrify the remaining Transiberian section; the Moscow—Irkutsk line (3,227 miles long) will be operated as before by d.c. as far as Marinsk (2,312 miles) and the remainder by the 25-kV 40-cycle system. I understand from recent reports that this work is almost complete.

A careful investigation was begun into the advantages of the various current systems which showed that the a.c. system was considerably cheaper to build. A large factory, specially for electric locomotives, has been built at Novocherkask and the locomotives mentioned above were built in large numbers. Of the N.8 type, 400 were ordered and of the VL.23, 300. The Russian railways and its supply industry have followed closely the general West European pattern of electrification without showing any originality in design. Recently, in fact, 100 locomotives were ordered from a French group of companies, of Co-Co wheel arrangement, based on the CC.7100 of the S.N.C.F. and supplied in three types. There was Type PF (see table) for passenger services, with entirely suspended motors and Alsthom drive; series GF, to work in multiple-unit for heavy goods traffic, with nose-suspended motors; and finally type GRF with a new type of regenerative brake. The goods locomotives are expected to haul 7,000-ton trains uphill on gradients of 1 in 100 with double heading or over 1 in 166 with single units. Finally, a number of plans for new designs have been announced, using ignitron rectifiers or dry silicon rectifiers. An identical 25 engines are being supplied by the same firms to China for the 4 ft. 8½ in. gauge systems which are being electrified in that country.

FORTHCOMING EVENTS

October 10.—Inst.T. Presidential address by K. W. C. Grand and presentation of awards. 66 Portland Place, W.1. 5.45 for 6 p.m.

October 11.—Inst.T. (Yorks). Chairman's inaugural address by C. T. Humpidge. Griffin Hotel, Leeds, 3. 6.30 p.m.

October 12.—L.R.T.L. Holiday reminiscences. 153 Drummond Street, N.W.1. 7 p.m.

Inst.T. (Southern). D. A. Bennett, "The Manufacture and Uses of Synthetic Rubber." Harbour Board Offices, Southampton. 5.45 p.m

October 13.—I.R.S.E. (York). D. Peverley, "Development in Mechanical Signalling Equipment." Signalling School, Toft Green, York. 5.30 p.m.

Inst.C.E. Informal discussion, Traffic Engineering Study group, "Economic and Efficient Traffic Surveys." Introduced by F. Garwood. Great George Street, S.W.1. 5.30 p.m.

L.R.T.L. C. Bennett, "Scandinavian Tramways." Y.M.C.A., Mount Pleasant, Liverpool. 7 p.m.

L.M.R.L.D.S. Domestic Debate, "That Faster Trains are more important than Brighter Stations." Friends House Euston Road, N.W.1.

Inst.T. (East Midlands). S. Rawlings Smith, "The Work of Trinity House and its Contribution to Safety at Sea." Co-operative Society Elizabethan Restaurant, Nottingham. 1 p.m.

Inst.T. (Portsmouth). Major D. S. Craig, "A Study of Royal Marine Activities—Exercise WALCHEREN." Royal Marine Barracks, Eastney. 7 p.m.

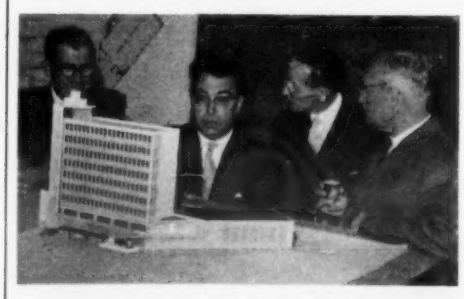
October 14.—G. E. Jenkins, "An Insight into the Intricacies of Household Removals." Royal Station Hotel, Newcastle. 7 p.m.

October 15.—I.R.S.E. (Bristol). Visit to Margam Marshalling Yard. S.C.T.S. Social evening. Railway Tavern, Liverpool Street, E.C.2. 6.30 p.m.

L.R.T.L. Annual general meeting at Blundell Street tram depot, Blackpool, 2.30 p.m.; followed by annual dinner at Blackpool Casino. 7 p.m.

October 16.—O.S. Visit to Blackburn Corporation Transport. L.R.T.L. Tour of Blackpool tramways.

The United States manufacturer of tyre valves, the Bridgeport Brass Company, Bridgeport, Connecticut, is to start production in Northern Ireland. A new Ulster company, named Bridgeport Brass, Limited, will occupy a 73,000-sq. ft. factory at Lisburn, Co. Antrim, built by the Northern Ireland government. It will produce tyre valves and valve accessories and expects to employ 400 Ulster workers, mostly men. Bridgeport Brass, Limited, the ninth U.S. firm to set up a European base in Northern Ireland, plans to occupy the Lisburn factory in February, 1961.



On the occasion of the laying of the foundation stone of the new U.I.C. headquarters building in Paris, Mr. John Ratter who headed the British delegation and is president-elect, looked at a model of the new building with Professor Oeftering (president), senior chairman of the German Federal Railway, M. Tuja, secretary-general, U.I.C., and M. Dargeou, general manager, S.N.C.F.

Swansea - Cardiff

Bristol - Bath

STC and Railway Modernization

Exeter - Newton Abbot

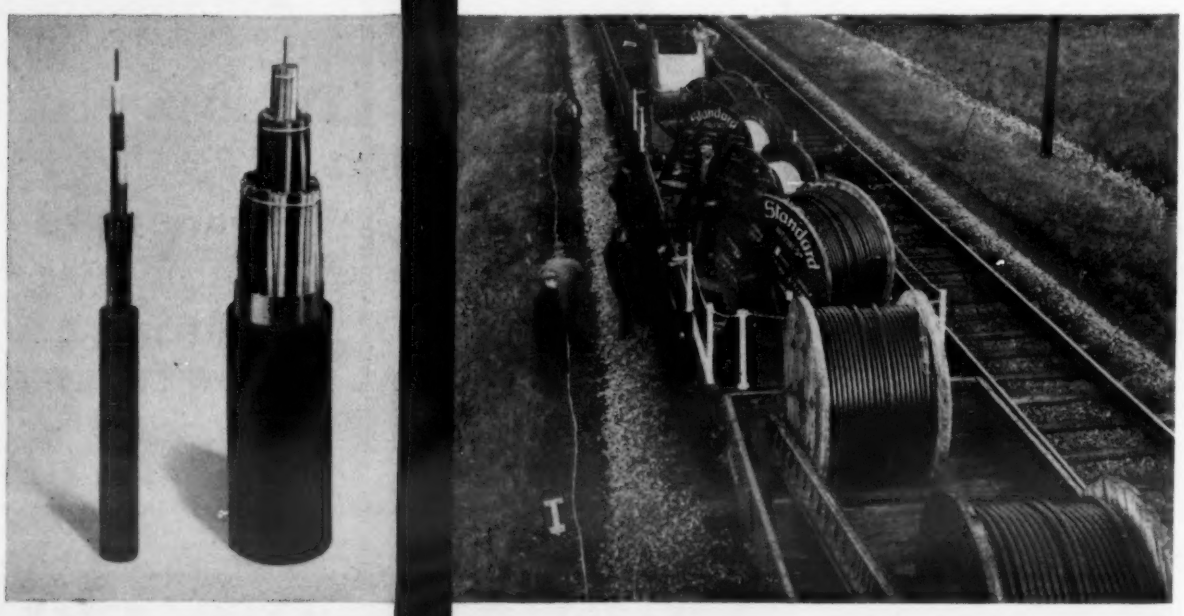
Three more STC communication installations for British Railways, Western Region

STC Type 163 Coaxial and Audio-frequency All-Plastic cables have been manufactured and supplied for the above Western Region communication modernization schemes.

Laying STC Polythene Coaxial and Audio cables alongside railway track, for direct burial into the ground, between Llanharan and Llantrisant. Each pair of coaxial cores has a capacity of 300 speech circuits. Expanded polythene is used for the coaxial dielectric and solid polythene for the insulation of the audio pairs and for the overall sheaths.

Left: STC 2-core Type 163 Coaxial cable.

Right: 27 Quad polythene insulated and sheathed telephone cable.



STC CABLE AND WIRE GROUP

60/38

Standard Telephones and Cables Limited

Registered Office: Connaught House, Aldwych, London W.C.2

TELEPHONE CABLE DIVISION: NORTH WOOLWICH · LONDON · E.16

NEW PULLMAN CARS

Inaugurated in the "Master Cutler"

IN a programme designed to replace many of the older Pullman cars operating on the Eastern and North Eastern regions of British Railways, the Pullman Car Co., Limited, placed an order with Metropolitan-Cammell Carriage and Wagon Co., Limited, for the manufacture of 44 new cars. The first of these cars were delivered to Doncaster and have been incorporated in the new *Master Cutler*, which made its inaugural run on September 28. All 44 cars, when delivered, will operate in the *Master Cutler*, *Yorkshire Pullman*, *Tees-Tyne Pullman* and *Queen of Scots* Pullman trains. Delivery of the remainder will be at the rate of nine or ten a month.

The new stock comprises eight first-class parlour cars with 24 seats each, 13 first-class kitchen cars with 20 seats each, seven second-class parlour cars with 42 seats each, 15 second-class kitchen cars with 30 seats each, and one second-class bar car with 24 seats. To meet the demands of standardisation, the cars have been built with contour and structural features common to B.R. stock, with exteriors painted in the traditional Pullman colouring of umber and cream and the new coat of arms.

New Pullman coach interiors, first class on the left and second class on the right. Features are wider windows (double-glazed in the main section) and fluorescent lighting

Named Stock

In addition to bearing serial numbers, the first-class cars have, in accordance with tradition, been given names as shown in the following tables:

13 First-Class Kitchen Cars

Schedule No.	*Name*
311	Eagle
312	Falcon
313	Finch
314	Hawk
315	Heron
316	Magpie
317	Raven
318	Robin
319	Snipe
320	Stork
321	Swift
322	Thrush
323	Wren

Eight First-Class Parlour Cars

Schedule No.	*Name*
324	Amber
325	Amethyst
326	Emerald
327	Garnet
328	Opal
329	Pearl
330	Ruby
331	Topaz

Second-Class Bar Car

Schedule No.	*Name*
354	The Hadrian Bar

Second-class cars have numbers only, shown on bodysides. The 15 second-class kitchen cars are numbered 332 to 346 and the seven second-class parlour cars are numbered 347 to 353.

All the cars are equipped with the Commonwealth bogie incorporating a single-casting cast-steel frame, using Timken tapered roller bearings and axle-boxes.

Some Notable Features

The new stock embodies a number of notable features, including improved windows, lighting, toilets and decor. The windows are increased in length from 4 ft. to 5 ft., the lower portion being double-glazed and the upper portion equipped with sliding lights which have hinged vanes to assist air extraction. Each window is a separate unit mounted in an aluminium-alloy frame, the joint between the frame and the outside body panel being made by the use of Clatonrite rubber moulding.

The cars are equipped with the Stone's pressure ventilating and heating system, which delivers fresh air, drawn from outside the car and heated by passing over steam ducts or electric heating elements, depending on the type of heating medium supplied. The temperature of the air is thermostatically controlled; it is delivered at low pressure through slots at about floor level and is extracted through the sliding ventilators or, when these are closed, through an aperture which surrounds the frame containing the ceiling light panels.

Fluorescent Lighting

The main lighting of the saloons is by fluorescent tubes; the main supply is by the normal 24-32 volt train lighting generators and batteries and is stepped up by transistor invertors to 80 volts 4½ kc., with a starting circuit for fluorescent tubes. The main lighting in the kitchens and pantries is also by fluorescent tubes.

The ceiling light panels consist of an aluminium frame with translucent corrugated Perspex. Each panel is 4 ft. by 2 ft. 8 in. and is lit by one warm-white fluorescent tube. Although there are only eight or nine such panels in the whole of each car, the general lighting is extremely good giving an intensity of 15 ft.-candles at table level. In addition ordinary tungsten lighting is provided by lamps situated under the luggage racks, on the partitions and at the tables themselves.

Special attention has been given to the layout and fittings of the toilets and a new style of wash-basin has been developed and mounted in an attractive cabinet. The walls are lined with laminated plastics with contrasting colours on the doors and the floors are in grey-green.

Luggage and Table Racks

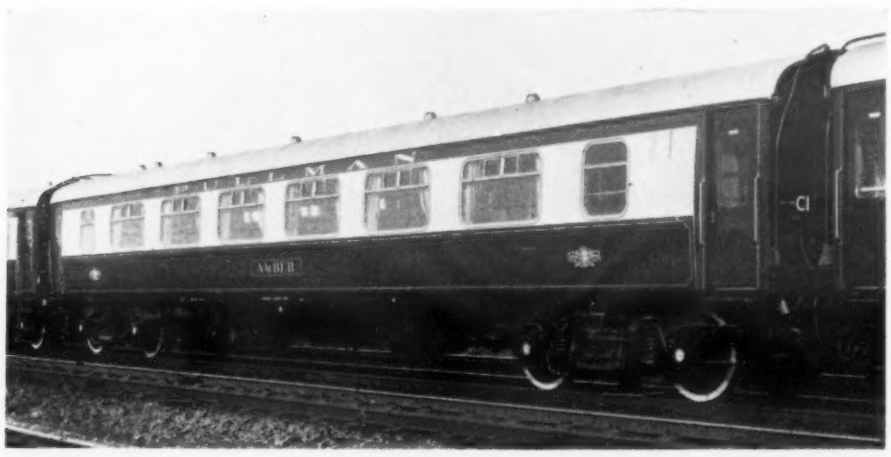
Luggage racks running the length of each saloon are of the semi-solid type and are Lanide covered, with an open grille in alternating sections. The racks are designed with two levels, the upper being the main rack for luggage while below is a smaller rack for lighter articles.

A feature of the tables is the outer end which stands away from the bodyside by a matter of 3 in.; in this space a rack is provided for holding papers, magazines and so on. In the case of tables where there are two chairs abreast, as in coupes, a special design of folding flap has been evolved; each passenger has an individual flap and when not required this can be folded under the table, giving more leg room and space. A point in connection with this feature is that a table can be prepared for a meal complete with cloth, cutlery and so on, with the flaps folded under the table. This permits easier access to the passengers occupying seats near the window; when seated, the flap can be brought into position level with the table surface.

Seating and Decor

Traditional Pullman seating has been retained, comprising in the first-class movable armchairs and in the second-class fixed seating two abreast on one side and single on the other. Both types of seat have however been thoroughly modernised in contour and springing and upholstered to suit the interior schemes of decoration.

A complete breakaway has been made with the traditional Pullman style of interior incorporating wood veneers with marquetry inlay. In order to achieve a style that was at once contemporary but dignified, the Pullman Car Company enlisted the services of Mr. John Carter, M.S.I.A., who has been largely responsible for the styling and colour of the interiors. Four different schemes have been adopted, two for the first-class and two for the second-class cars.



"Amber," one of the new first-class cars ready for its inaugural run in the "Master Cutler" on September 28

In one first-class scheme, ceilings are in French grey using either Lanide or Warerite Finaweave with a black line. Luggage racks are finished to match. Partitions are in polished Rio rosewood, table tops are covered in black Lanide. Chairs are upholstered in special orange and black moquette and the patterned Wilton carpet consists of a serrated line of black, charcoal and light grey. Curtains are of folkweave with bright colours to tone.

The second first-class scheme has ceilings covered with Lanide light tan colour or special Warerite buff with a fine black line. Luggage racks and curtain pelmets are covered in Lanide to tone with partitions, which are in polished Rio rosewood and table tops in Lanide Sirocco 29. In this scheme the chairs are upholstered with a special bronze green and black moquette and the patterned Wilton carpet consists of a serrated line of black, bronze green and light grey. Curtains are of folkweave material boldly patterned to tone.

Second-Class Schemes

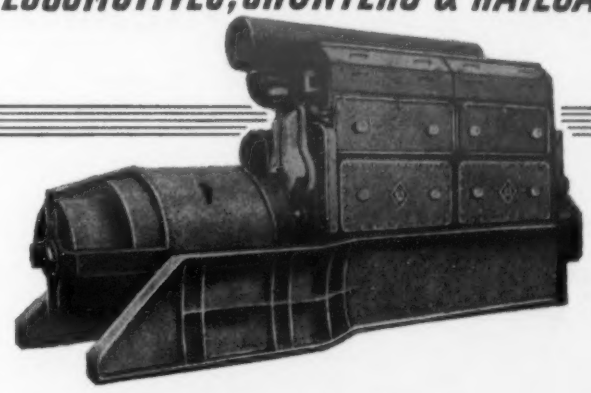
The second-class parlour cars have ceilings covered in special Warerite grey Finaweave with black lines. The luggage racks are covered in Lanide French grey and the body walls are in special Warerite grey. The partition end doors are in polished Siamese teak veneer and the table tops

(*Continued on page* 18)

B.T.C.
ELECTRIFICATION
MANCHESTER — CREWE
LIVERPOOL — CREWE
GLASGOW SUBURBAN
Using Single Phase Switchgear Type K11 330 MVA at 27·5kV and Type B.41 165 MVA at 6·9kV.
27·5kV and 6·9kV single phase metalclad oil filled Switchgear for the Feeder Station and Track Sectioning Cabin Sub-Stations controlling and protecting the incoming supplies and feeders to the overhead conductors.
The equipments are of unit construction and are readily extensible to form multi-panel switchboards.
One of the K11 switchboards supplied to the B.T.C. Midland Region.

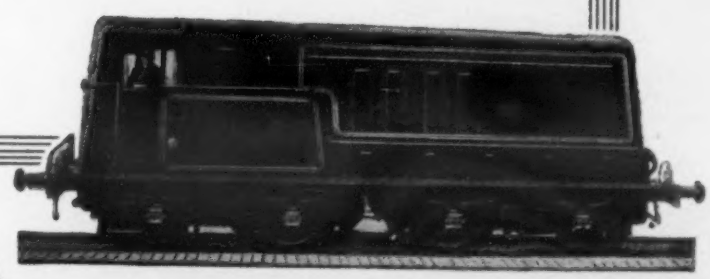
SWITCHGEAR & COWANS LTD.
MANCHESTER

H&W Diesel Engines
for LOCOMOTIVES, SHUNTERS & RAILCARS

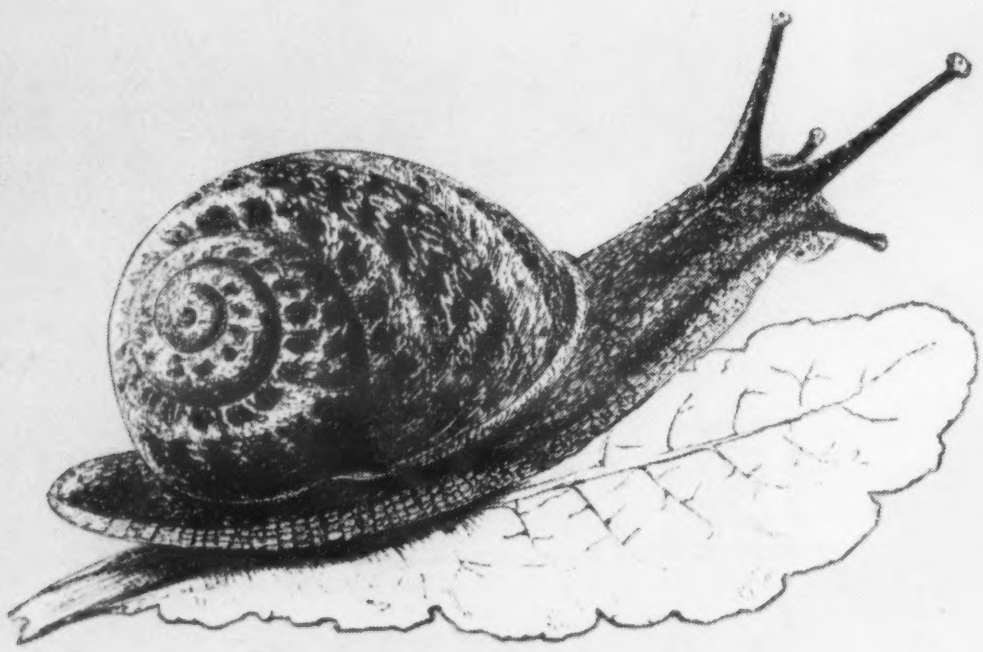


TWO-CYCLE DIESEL ENGINES
AND
FOUR-CYCLE SUPERCHARGED DIESEL ENGINES
FOR
RAIL TRACTION

Supplied as straight in-line or 'V' type units in powers from 250 b.h.p. to 2,000 b.h.p.



HARLAND & WOLFF LIMITED
Enquiries: Queen's Island, Belfast — London Office: 9, Whitehall, S.W.1
BELFAST GLASGOW LONDON LIVERPOOL SOUTHAMPTON
L.268A



MADE TO MEASURE

The snail, most thoughtfully, goes to some pains to reconcile his own needs with those of the conchologist.

• As home and protection, his shell must be tough, portable, and very much made to measure. At the same time, it must have just those qualities which—in due course—will delight the collector.

• Sheet steel from the City of Steel follows no less closely its intended purpose. Each order is treated as a separate assignment so that you, the manufacturer, get the particular kind of steel your product needs.

• Steel, in fact, made to measure—to your exact requirements.

THE STEEL COMPANY OF WALES LIMITED

TRAVOLATORS AT THE BANK STATION

For Waterloo and City Passengers

OTHER IMPROVEMENTS AT BANK STATION BY SOUTHERN REGION

THE Bank Travolator, which now links the Southern Region Waterloo and City line platforms with the high level circulating area and Bank Underground Station, was brought into use on September 27 after a formal opening by Sir Edmund Stockdale, Lord Mayor of London. Something very like this installation might have been built more than half a century ago. In 1903, five years after the Waterloo and City Railway, then independent, was opened, a Leeds firm prepared a scheme plan for an almost identical form of transporter for use on this site. It was abandoned, probably because the tunnel was crooked.

So passengers continued to toil up the 1 in 7.4 incline of the 340-ft. long, 13-ft. wide subway, assisted latterly by sets of five steps at 40-ft. intervals which reduced the gradient to 1 in 14. Long before the war it became obvious that this was not a sufficiently effective way of clearing the rush-hour crowds. The Southern Railway Company made escalator proposals, sanctioned by Parliament in 1939, but the war and postwar capital expenditure restrictions held back the implementation of the scheme. When, in 1955, the Southern Region was able to tackle this long-standing problem it engaged a firm of consulting engineers to approach the matter afresh.

Postwar Plan

It was during the development of the scheme which they prepared—largely following the prewar plan—that it became apparent that something similar to what the Americans call a "speed walk" would be cheaper and quicker to instal than escalators. The plan finally settled on to instal two Otis Elevator Company Travolators enjoyed certain further advantages over the original scheme: it would carry the passengers farther than could escalators; the existing subway could be retained; and construction would involve far less interference either to passengers or to the existing drainage and services.

The version of the Travolators developed in this country for this scheme are, in fact, based on the Otis escalators used by the London Transport Executive. At their maximum speed of 180 ft. per min. each can carry 10,000 people an hour up an incline of 1 in 7. Despite the comparative economy of the scheme fairly massive works were necessary to enable the installation to be carried out and to take full advantage of it.

Extensive Works

As finally approved in March, 1957, the scheme involved:

(*a*) The construction of a tunnel of 16 ft. 6 in. internal diameter opposite platform No. 2, running approximately parallel to the existing subway, housing two Travolators, each 4 ft. wide, together with a machinery room and substation chamber.

(*b*) The construction of six new openings 9 ft. in width, in the walls separating platforms 1 and 2 to facilitate the flow of passengers from No. 1 platform to the base of the Travolator.

(*c*) Substitution of the existing timber platforms by concrete, platform levels being raised 2½ in. to make them 1 ft. 8 in. above rail level.

(*d*) Relining of platform tunnels and the existing subway, including the provision of a false ceiling to take lighting cables, provision for drainage of seepage water.

(*e*) Diversion of existing drains, cables and public services necessitated by the above works.

(*f*) The reconstruction of the high-level subways leading to Walbrook and Poultry, including a new ticket office and the provision of certain staff amenities.

The 1957 proposals also provided for the relining and redecorating of the existing subway.

Construction

Work began in 1957 with the closing of the subways leading to Walbrook and Poultry. Between these two entrances a shaft was driven down to the level of the tunnel for the Travolator; from here an 8-ft. pilot tunnel was driven down the incline and later enlarged to 16 ft. 6 in. in diameter. Excavation had to be carried out by night and the spoil hoisted out and removed by lorry until the line of the existing low level siding tunnel was reached. It then became possible to remove spoil by wagons at night via Waterloo. Cast-iron segmental linings with lead caulked joints were used.

At the lower end this 282-ft. tunnel was enlarged from 16 ft. 6 in. to 19 ft. 6 in. diameter for a further 52 ft. to accommodate the lower landing and return machinery. Beyond this point it enlarges by another 10 ft. in diameter for a distance of 19 ft. 9 in. to provide a circulating area for passengers arriving at the foot of the Travolators and from the existing subway. At the same time six new openings, each 9 ft. wide, were cut in the dividing wall between the two platforms to facilitate the flow of passengers, etc., to the base of the Travolators. At the upper end of the Travolator tunnel the machine chamber and booking hall is approximately 100 ft. long, 35 ft. wide, and 30 ft. deep. Because it lies in the filling over the Walbrook and its tributaries it was decided to use a reinforced concrete raft as a foundation.

Method

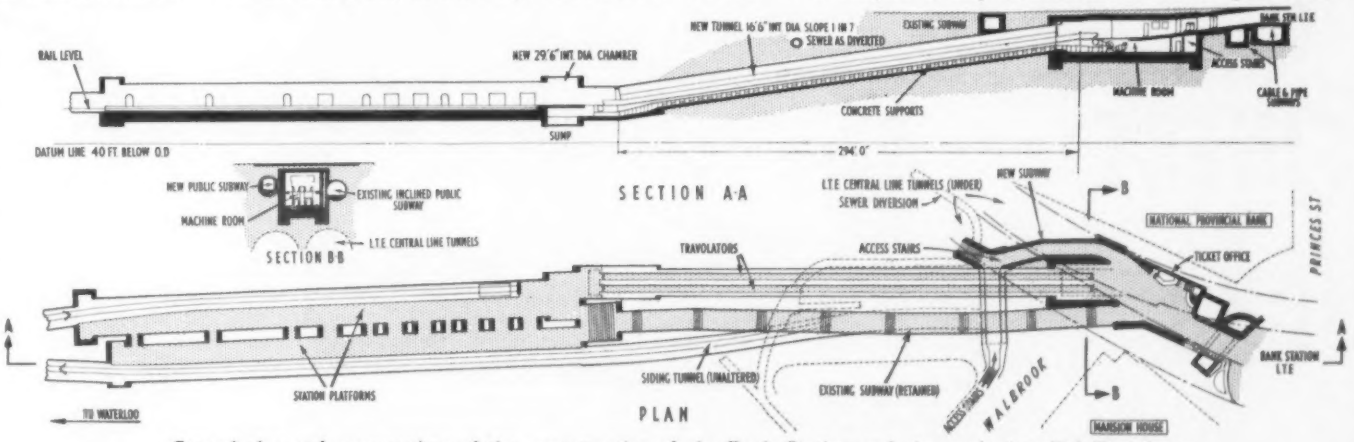
To keep down interference with traffic overhead and the movement of passengers the construction of the walls was carried out in a series of headings driven round the sides of the chamber. The dumpling and excavation for the floor were then removed and the floor constructed in strips as the excavation proceeded. The whole of the area of the booking hall and machine chamber was completely "tanked" with 1¼ in. asphalte applied hot. The 3-ft. reinforced concrete roof slab, which varies from 3 ft. 6 in. to 1 ft. below the road surface, was constructed in strips about 8 ft. wide in open trench. The road traffic during construction was carried on temporary steel decking which often had to be removed at night to allow construction to proceed and the roadway made good each time early enough to enable road traffic to proceed during the day.

About 10,500 cu. yd. of material was removed and some 5,000 cu. yd. of plain and reinforced concrete placed. Some 800 tons of cast-iron segments were used in the construction of the tunnels.

Modernised platform layout at Bank Station of the Waterloo and City Line

Every weekday 42,000 passengers will be using them, a very large number of them concentrated into the peak hours. They use a continuous flat platform travelling at a lower angle of incline than an escalator, which is normally banked at 30 deg. The Bank Travolators have an incline angle of 8 deg. 07 min. 48 sec., or 1 in 7. There is a vertical rise of 42 ft. over an incline length of just under 297 ft. The overall length, which includes horizontal portions at top and bottom landings, is just under 302 ft. 6 in. and the width is 40 in. tapering out to 48 in. at a point below the handrails.

The maximum speed can be adjusted for passenger traffic from 180 ft. down to a speed of 90 ft. per minute and, in addition, to a crawl or inching speed of about 36 ft. per min. for maintenance purposes. Each Travolator has its own drive unit in a motor room beneath the upper landing. It consists of a high-efficiency worm gear with multi-start worm, connecting up a large diameter coupling to the shaft of a variable-speed three-phase 85-h.p. A.E.I. commutator motor. The coupling forms the drum of an electro-magnetic brake, which is spring applied and magnetically released. It is designed to stop the Travolator smothly under any conditions that may prevail.



General plan and cross-sections of the reconstruction of the Bank Station and the newly installed Travolators

Control Gear

The continuously rated motor is of the Schrage type with pilot-motor operated brush gear. An individual automatic magnet-operated control gear of the contactor type is used to start and stop each of the Travolators. Each control gear will start or run its Travolator either upwards or downwards at maximum speed or the other speeds referred to. Each control embodies switches for operating the service brake on the drive machine and the pilot motor controlling the main motor brush gear. All magnets operate from a d.c. supply obtained from a rectified a.c. supply.

Up-down buttons are provided for local control by each Travolator and there are five emergency switches on the balustrade deck panelling between the two tracks. They are spaced out along the incline. There is also a key-operated up-down and stop switch at the top and bottom landings. To save undue wear during the off-peak periods the normal control over speed will be by means of a selenium cell, which cuts the travel strip speed to 90 ft. per min. when the Travolator concerned has carried no passengers for a predetermined time. This device can be over-ridden by switches at the lower landing and on the station platform, which can be used to reduce the speed to this 90 ft. per min. in the downwards direction if the station platform is becoming congested.

Strips

Each Travolator strip consists of 488 individual platforms, each 40 in. by 16 in. surfaced with special-quality aluminium. Each rides on four ball-bearing wheels of phenolic and canvas materials. The platform wheels run on tracks which form the contour of the Travolator and are designed to confine side movement within narrow limits. The platforms are connected together and driven by two roller chains manufactured to very fine tolerances: the chains are assembled in matched lengths. At each end of the Travolators the close-cleated platforms pass through a comb plate. Just beyond the toothed combs and beneath the fixed floors are located pairs of sprocket wheels over which the chains pass.

The top sprockets on each of the Travolators, mounted on substantial shafts are driven by the motors, each through its reduction gear via a duplex roller chain. These top sprockets also carry the disc emergency brake which stops the Travolator if the drive chain breaks. The cotton duck and rubber handrails which incorporate a continuous steel tape are driven separately at the upper landing newel wheel by a single chain from the drive shaft. They are supported on the return side by a series of ball-bearing phenolic rollers. The "travel strips" are designed for intensive service with safety factors based on a working load of 300 lb. over 4.45 sq. ft. of the area available for passenger loading. The Travolators are each carried by main frames of constructional steel supported on substantial concrete foundations extending the whole length of the inclined and horizontal portions. A number of additional safety devices are installed, including a centrifugal-type excess speed governor, broken chain devices and a broken handrail switch. Warning-light indicators in the machine room show when the broken chain devices are nearing a point at which they will operate. An electric fan in the machine room passes air through the under-surface pit for cooling purposes and normally discharges it at ceiling level in the ticket hall. The direction of the flow can, however, be reversed.

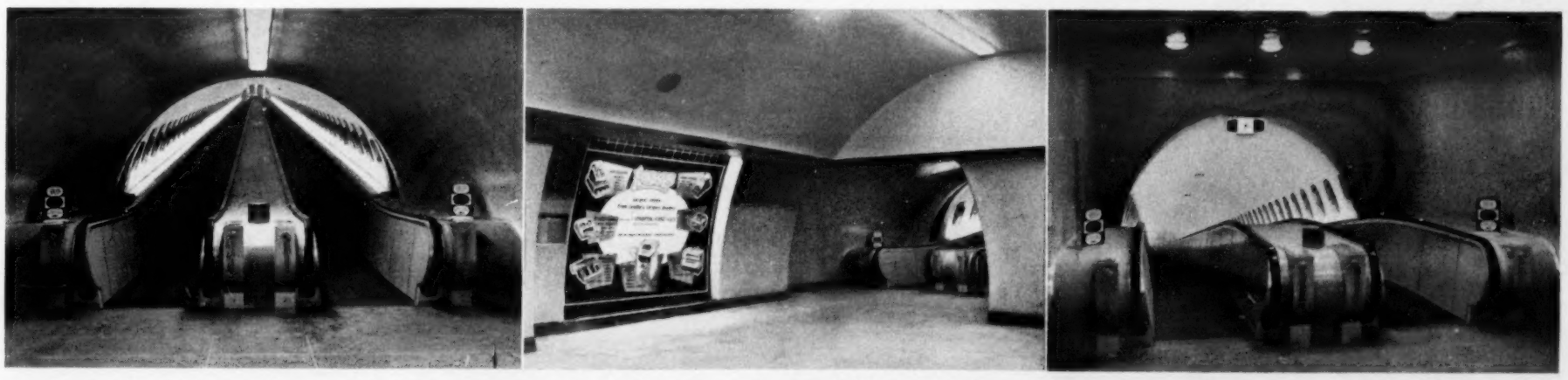
Finishing Materials

The Travolator tunnel has a false ceiling of Celactite corrugated waterproof steel sheet lining to which is attached an inner lining of Stelvetite sheeting. This is finished in blue-brown plastics coating and forms a novel finish to a tunnel. We refer to it in more detail below. The side walls at the foot of the Travolator have a blue-grey mosaic vitreous glass finish. On each side of the travel strip there is a shallow skirting with flat sloping panels above. There is deck panelling between each Travolator and between the tunnel side walls of double armoured plywood with aluminium on the visible side and galvanised sheet steel on the reverse. The panels are faced with a grey plastics material. Special advertising frames have been installed on both sides of the tunnel harmonising with the general scheme of decoration.

Pioneered and manufactured by John Summers and Sons, Limited, at Shotton, Stelvetite is being taken up by an increasingly large number of manufacturers for items from washing machines to motor car trim. Its main virtues are the combination of the strength of steel with the colourful attractiveness of plastics, that it can be worked as ordinary steel, it resists bumps, scratches, oils, acids and dirt of all kinds, and is extremely easy to clean. The p.v.c. surface, bonded to the steel, is manufactured by B.X. Plastics, Limited, and is warm and soft to the touch. It eliminates the need for painting. Stelvetite has a very low surface spread of flame: tests carried out by the Fire Research Station place it in Class I of British Standard 476. Stelvetite can be embossed in different textures and the 8,000 sq. ft. of the material lining the Travolator tunnel has a "tweed" finish which, with the brilliant illumination throughout, gives an appearance of warmth and modernity. It was installed by the Anderson Construction Co., Limited.

The balustrading and decking panels on both sides of each travel strip, manufactured by William Mallinson and Sons, Limited, consist of Armourply metal-faced plywood, incorporating Galvatite hot-dipped galvanised sheet steel, produced by John Summers and Sons, Limited, on the

(*Continued on page* 18)



The Southern Region Travolator at Bank Station of the Waterloo and City Line was inaugurated by the Lord Mayor of London on September 27: From platform level; the new low-level circulating area; right, the upper level

Most of the cables and other public services were diverted by trenching in the roadway. But a 5-ft. diameter sewer crossing the booking hall area had to be diverted by tunnelling a new 5-ft. diameter drain of cast-iron segments lined with concrete and with an engineering brick invert. An additional pipe subway with a new shaft had to be constructed under the main concourse and the London Transport Executive's main feeder track cables had, too, to be diverted.

Equipment

The two Travolators, although similar in principle to the American "speed walks," are the first of their particular type in the world. They are designed to heavy-duty requirements to carry large numbers of passengers ascending and descending.

B.R. Electrification Conference

(*Continued from page 3*)

screen against induction, and in fact their removal is also required for locating the overhead contact system supports. Since the modernisation plan provided for the modernisation of the signalling system and colour light signalling on the main trunk routes, the introduction of a.c. is not a serious additional liability and experience on the Continent had shown that post office circuits were not unduly affected by a.c. traction. However, the British Post Office drew attention to circumstances existing in Great Britain which were different from those normally obtaining abroad, in particular to the use of unbalanced circuits for dialling and ringing. It was therefore decided to restrict the interference at source. One method employed is to introduce a return conductor with booster transformers at intervals of about two miles. The booster transformer has proved to be an effective solution to the interference problem. It will only be used where necessary. Less expensive alternative methods are under development.

Rolling Stock

One of the great advantages which a.c. rolling stock has is the facility of close speed control not so economically practicable with d.c. This characteristic is of greater consequence for locomotives than for multiple-unit passenger trains, but it is a quality which ranks high on the credit side of the new system. It was also quickly decided that no entirely satisfactory a.c. commutator motor had yet established itself as being superior to a d.c. motor in conjunction with a rectifier. Fortunately a number of varieties of rectifier could be introduced from which a wealth of experience could be obtained. A final feature that had to be catered for was the necessity, as already explained, to enable the locomotives and multiple-unit sets to operate on two voltages. This was an undesirable complication from the point of view of the additional apparatus and some additional expense.

These basic considerations were the foundation of British railway requirements around which the performance to meet operational conditions had to be designed. Implementation of the modernisation plan required that a.c. suburban electrification in East Anglia and Glasgow ranked equally for completion with the first stage of the Euston—Manchester—Liverpool main-line scheme, which provided also for various suburban schemes in the vicinity of the large towns served by the through services. It has been explained that one of the merits of electrification is the removal from the train of items that can go wrong. Therefore, it is somewhat of a paradox with the a.c. system equipment formerly in a lineside substation now forms part of the electric tractor. In a sense it is a retrograde step since each unit virtually becomes a mobile substation. However, the saving grace is that those items which are additional are static, having no moving parts, i.e. transformer and rectifier, and consequently little maintenance. About 400 sets of either three or four cars have been built during the last three years and the introduction of such quantities of new equipment, mostly of a prototype character, must be unique. Recent trends favour semi-conductors such as germanium or silicon for the rectification of a.c. current. They lend themselves to underframe mounting, require the minimum of accessories and there are no problems of starting in cold weather. The first high speed multiple-unit train sets for nonstop services from Liverpool Street to Clacton with corridor stock and refreshment facilities have recently been authorised, and will be capable of a maximum speed of 100 m.p.h. Built into 8- or 10-car trains with two or three motor coaches per train the total available horsepower will be adequate to give spectacular results. Silicon rectifiers are being employed for these trains.

Locomotives

Basically the locomotives represent four different approaches to two kinds of duty laid down by British Railway specifications. These duties were necessary to fulfil the intentions of the Modernisation Plan for faster and more intensive train schedules and consistent punctuality. Two types of locomotives can cover the whole range of work, one for mixed traffic and the other for heavy mineral work. In the event, both types were identical in appearance and equipment, but a different gear ratio limits the speed of the freight locomotives to 80 m.p.h. whereas the mixed-traffic locomotive has a maximum speed of 100 m.p.h. The difficulties of load gauge and of speed restrictions on British Railways are well known, and in spite of a large programme of track improvement and re-alignment on the London Midland Region route from Euston to Manchester, the effect of speed restrictions which will still continue, because of curves and junctions, precludes a speed in excess of 75 m.p.h. if infinite power, acceleration and braking are available. The proposed average speed of 67 m.p.h., including 4 per cent make-up gives an improvement of 9 per cent over a steam hauled 475-ton passenger train.

The locomotives are four axle BoBo units, which due to the limitation imposed by the chief civil engineer must not exceed 20 tons axle weight, nor have a wheel diameter less than 48 in. It was decided to incorporate flexible drives and to provide a free issue to the manufacturers of Brown Boveri air blast circuit breakers, and the improved Faiveley pantograph manufactured by J. Stone and Co. (Deptford), Limited, which are also standard on multiple-unit sets. The difficulties of the loading gauge made the task of the manufacturers exceedingly difficult, and it is therefore something of a triumph that all designs eventually came out well within the stipulated limit of 50 tons, with a rating, when assessed on the U.I.C. Code 614.0 based on the one-hour test of 4,260 s.h.p.

Rectifiers

The previously mentioned decision with regard to the use of d.c. motors and rectifiers left the manufacturers free to offer various designs and arrangements. Similarly, no preferences were expressed either for high- or low-voltage tap changing for speed control. Both methods were chosen for trial and a considerable measure of freedom was also given in respect of mechanical design. It was, however, required that all driving cabs should be substantially similar and that the driving technique should be standardised.

All these decisions were taken several years ago when the semi-conductor rectifier, already acceptable for multiple-unit operation, was not thought to be sufficiently developed for locomotive work where operating conditions cannot be so accurately determined. However, the advance in technique has been even swifter than anticipated with the result that the second part of the prototype locomotive delivery consisting of the 40 to be built in railway workshops, and one by the English Electric Company, will have either germanium or silicon rectifiers. The saving in weight and space compared with the mercury arc rectifier arrangement has permitted the use of rheostatic braking to secure economies from reduced brake wear and tyre maintenance.

★

TRAVOLATORS AT THE BANK STATION

(*Continued from page* 17)

reverse side. Galvatite was also used on the reverse side of the curved panels and skirting panels. Yet another John Summers product, Zintec electrolytically galvanised sheet steel, was used on the face of the skirting panels.

Lighting

In the Travolator tunnel continuous fluorescent trough lighting is provided at deck level with a central trough of fluorescent lighting in the ceiling at their foot. Between the deck panelling adjacent to the tunnel lining provision has been made for the installation of specially designed lighting to obviate any glare from the aluminium travel strips. Beneath the Travolator there are fixed lights and plug-in points at 30 ft. centres, both at 50 volts for the use of maintenance staff.

On both station platforms and in the existing pedestrian subway fluorescent strip lighting has been installed and also in the new Walbrook—Poultry subway. The tungsten lights in the booking hall are in flush circular fittings. The inclined foot subway has also been redecorated and the walls retiled in pastel blue. Station tunnels have also been renovated and their walls finished in vitreous glass mosaic of blue-grey, while the interplatform openings have a grey finish. The handrail in the pedestrian tunnel, which in the past was set to one side to form a narrow path for the few people walking against the tide, has now been placed in the centre of the subway.

Direction Signs

The name of the station has been worked at 18-ft. intervals into the mosaic covering of the platform walling. The ticket hall has a special mosaic finish and the new subways to Walbrook and Poultry are finished in blue tiles. All direction signs, specially manufactured by the London Transport Executive, are fed from two alternative electric supplies to cover the possibility of power failure, as is the lighting system generally. There is a public-address system operated from the signal cabin.

The actual speed at which the Travolators will be run can only be decided by trial and error. It is intended to run both tracks up during the morning peak, but one each way during the rest of the day. To take advantage of the speed at which the Travolators will be able to clear the platforms, the train service interval during peak periods will be cut from 3 min. to 2½ min., which should do a good deal to alleviate crowding on the line.

The scheme was developed and the work designed and carried out by Mott Hay and Anderson, consulting engineers, under the general direction of Mr. A. H. Cantrell, B.Sc., M.I.C.E., chief civil engineer, Southern Region, British Railways. The contractors for the tunnelling and general engineering work were Mitchell Brothers, Sons and Co., Limited, and the contractor for the supply and installation of the Travolator was the Otis Elevator Company. The electrical equipment, including the motors and control gear, were manufactured and installed by Associated Electrical Industries (Rugby), Limited.

★

NEW PULLMAN CARS

(*Continued from page* 15)

are of Warerite terracotta. The main floor is covered in lino with a charcoal background, the aisle of the car between the tables is furnished with Wilton carpet of serrated design and coloured to suit. Curtains again are of folkweave material in gay colours.

Second-class kitchen cars have ceilings covered in Warerite dove grey, as also are the body walls. The luggage racks are covered in Lanide French grey while the partitions and partition doors are in polished English walnut. Table tops are covered in Warerite fresco blue and the upholstery is in blue or green ribbed moquette; the aisle carpet is specially woven to suit.

Anodised Aluminium Fittings

All metal fittings are finished to anodised aluminium matt, except in toilets and kitchens where the finish is of polished chromium plate. Interesting features are the partitions which, in the usual Pullman practice, divide the main saloon into two portions; in the new cars the partition is solid from floor to waist rail and from there to the ceiling the partition is of toughened glass. This enhances the spacious appearance of the interiors.

The body walls and shelving of kitchens and pantries are lined throughout in light grey Formica. Kitchen sinks and sterilisers are in stainless steel and the stoves have been developed by Radiation, Limited, in conjunction with the Pullman Car Company. Propane gas is used and modern ideas have been introduced to assist in production of grills.

The cars are wired for loud speakers for a public address system, should it be decided to install such equipment in these trains.

The more recent steel Pullman coaches to be replaced by the new cars are to be reconditioned and transferred to less-arduous service in Southern Region Pullman trains—the first such being the *Bournemouth Belle*, probably by January, 1961. The old timber coaches, one of which still in service dates back to 1906, will be withdrawn and converted for camping. About 20 such will be converted during the coming winter to make a useful addition to British Railways' extremely popular camping coach service.

Solus-Schall, Limited, County Building, Honeypot Lane, Stanmore, Middlesex, is now marketing a direct-reading 8-mm. magnetic thickness gauge, Model 2211, which measures the thickness of steel tubes or steel plates. The equipment permits accurate and rapid identification of sound tubes or plates from those corroded beyond the limit of a specified safety margin; it is transportable, weighing about 30 lb., and operates from battery or mains power supply.

MERCEDES-BENZ

THE WORLD'S FINEST DIESEL TRUCKS

LK327
13-tons gross, 5.1 litre Mercedes-Benz 6-cylinder diesel. All synchromesh 5-speed gearbox. Available as tipper, tractor or freighter.

LP327
13-tons gross, 5.1 litre Mercedes-Benz 6-cylinder diesel. All synchromesh 5-speed gearbox. Available as platform truck or tractor.

Never before has there been available to British Operators trucks as tough, long-lasting and full of 'go' as these superb Mercedes-Benz. They've been tested and proved best on mountains, motorways, jungle tracks and everyday highways and byways. They're engineered for the toughest conditions known to man. That's why they far outlast any ordinary truck.

TRIPLE SAFE BRAKING SYSTEM
1 Air/Hydraulic service brake
2 Exhaust brake for extra safety
3 'Multi-pull' hand-brake

STANDARD EQUIPMENT
- Powerful, individually operated, heater and demister
- Flashing indicators
- Bumper Bars
- 3-way adjustable driver's seat
- Big luxurious cab with all the comfort of a car

SERVICED THROUGHOUT BRITAIN BY MERCEDES-BENZ APPOINTED DISTRIBUTORS

MERCEDES-BENZ (GREAT BRITAIN) LTD.
COMMERCIAL VEHICLE DIVISION
GREAT WEST ROAD, BRENTFORD, MIDDX.
TELEPHONE: ISLEWORTH 2151

SOCIAL AND PERSONAL

R.H.A. Chairman Elected

THE national council of the Road Haulage Association has elected Mr. J. B. Mitchell for its new chairman to succeed the late Mr. H. H. Crow. Mr. Mitchell is a Scottish member, his business being the Scottish Central Carting Co., Limited, of Leith. He has been an R.H.A. vice-chairman since 1955. It is announced that Mr. G. K. Newman, M.A., the recently appointed chief executive officer of the Association, has now assumed instead the title of secretary-general. A deputy secretary-general has been appointed, Mr. E. W. Russell, A.C.I.S. Mr. Mitchell received an engineering training with the former Scottish Motor Traction Co., Limited, and joined the Leith haulage business (which was established in 1901) as manager in 1935. He became managing director in 1950. He participated in the Scottish Commercial Motor Users Association and has been a member of the Scottish area committee of its successor, the R.H.A., almost since its formation and he was area chairman in 1956-58. For 10 years he has been on the national council of the Association. Mr. Mitchell, who has acted as chairman since the death of Mr. Crow, will preside at the R.H.A. annual conference in Blackpool next week.

Mr. J. B. Mitchell

* * *

Mr. S. G. Jones, legal adviser, has been appointed secretary to the London Transport Executive with effect from October 3. He succeeds Mr. R. M. Robbins, who has received another appointment as recently announced.

* * *

Sir Ralf B. Emerson, C.I.E., O.B.E., has been appointed to the board of the Metropolitan-Cammell Carriage and Wagon Co., Limited. He was formerly chairman and general manager of the Nigerian Railway Corporation.

* * *

Mr. E. F. Clarke, A.M.I.Mech.E., has been appointed chief engineer of Guy Motors, Limited. He joins Guy Motors from Dennis Brothers, Limited, where he has been project engineer on the design and development of new vehicles. Previous to this he was assistant experimental engineer with A.E.C., Limited. His new appointment takes effect from October 10.

Mr. E. F. Clarke

* * *

Mr. K. W. C. Grand, a member of the British Transport Commission, will deliver his presidential address to the Institute of Transport at the inaugural meeting of the 1960-61 session on October 10 in the Jarvis Hall of the Royal Institute of British Architects, 66 Portland Place, London, W.1. Mr. G. W. Quick Smith, C.B.E., adviser (special projects), British Transport Commission, has been elected a vice-president of the Institute of Transport to fill the vacancy caused by the death of Mr. H. H. Crow.

* * *

Mr. D. Fenton has been appointed movement officer (traffic headquarters), Eastern Region, B.R.

* * *

Mr. K. Holmes, chief schedules officer, has been appointed assistant traffic manager, Northern General Transport Co., Limited.

* * *

Mr. D. H. Millership has been appointed assistant (salaried staff), regional establishment and staff office, London Midland Region, B.R.

* * *

Mr. W. C. Reid, a director of Albion Motors, Limited, has been appointed a member of the Scottish Board for Industry.

* * *

Mr. T. C. West, F.R.I.C.S., estate agent and rating surveyor, London Transport, retired on September 30. He joined the L.G.O.C. as a surveyor in 1912 and became estate agent in 1940.

* * *

We regret to record the death of Lieut.-Cmdr. G. C. Hans Hamilton, C.B.E., M.A., R.N.V.R. (Retd.), a member of the board of Tarmac, Limited, and chairman of Tarslag, Limited, and also a director of the Expanded Metal Co., Limited.

* * *

We record with regret the death of Sir Charles Bruce-Gardner, at the age of 72. He was executive chairman of the Society of British Aircraft Constructors from 1938 to 1943 and a member of the then Civil Aviation Planning Committee. Sir Charles was also deputy chairman of the Steel Company of Wales and a director of Crompton Parkinson, Limited.

* * *

The South Yorkshire section of the Institute of Materials Handling is to hold a one-day conference entitled "Top Management Takes a New Look at Materials Handling" on November 30 at the Grand Hotel, Sheffield. Of the four sessions, one, entitled "By Road or By Rail," provides a platform for leading representatives of road and rail haulage from which they will endeavour to explain the respective advantages of sending goods by either route. It is hoped to have as chairman of this session a prominent user.

Urban Road Planning Adviser

THE Minister of Transport has appointed an adviser on urban road planning in his department. He will undertake the study of the long-term development of roads and traffic in urban areas and their influence on the urban environment. The holder of this new appointment is Mr. C. D. Buchanan, B.Sc., A.M.I.C.E., A.R.I.B.A., M.T.P.I. He was previously a Principal Inspector (Special Inquiries) in the Ministry of Housing and Local Government, but he has also served as an Assistant Engineer in the Ministry of Transport. He recently conducted the inquiry into the proposed Piccadilly development and has presided over similar inquiries concerned with site developments, including that at Waterloo Station. It will be noted that he has the distinction of holding professional qualifications in civil engineering, architecture and town planning.

* * *

Mr. E. D. Trask, M.I.Mech.E., M.I.Loco.E., assistant to general manager (special duties), Eastern Region, B.R., retired on September 30 after 49 years' railway service. He began his railway career at Doncaster works, under the late Sir Nigel Gresley, in 1911. During the 1914-18 war he served first of all with the Yeomanry, then the Royal Field Artillery and then the Royal Flying Corps in which he was a flying instructor. He rejoined the Great Northern Railway in 1919 and in 1923 was appointed assistant district locomotive superintendent at Neasden, L.N.E.R. Three years later he became a technical assistant to the locomotive running superintendent, Southern Area, L.N.E.R. After service at Grantham and Peterborough, Mr. Trask became district locomotive superintendent, Gateshead, in 1934, moving to a similar post for the combined districts of York and Leeds in 1937. A year later he was appointed locomotive running superintendent, Scottish Area, L.N.E.R.; he retained this position until the nationalisation of the railways, when he was appointed assistant motive power superintendent, Scottish Region. In January, 1951, he became motive power superintendent, Scottish Region, and in February, 1954, was appointed motive power superintendent, Eastern Region, a position he held until July, 1959, when he relinquished that post to take up that from which he has now retired. Mr. Trask was responsible for the maintenance and working of the first B.R. diesel railcars when these were introduced at Leeds and Bradford in 1954 and has been very closely concerned with the maintenance and working of all forms of diesel traction in his region. He is a member of council of the Institution of Locomotive Engineers.

Mr. E. D. Trask

* * *

We record with regret the death of Mr. A. E. Tattersall, who at the time of his retirement in 1947 was assistant chief engineer (signals), London and North Eastern Railway. He was 77. Mr. Tattersall began his railway career in the signalling department of the Lancashire and Yorkshire Railway. He was responsible for the introduction into this country of route relay interlocking and other technical advances, including the junction indicator. He was made assistant chief engineer (signals) of the L.N.E.R. in 1943.

Broadcast to France: B.B.C. commentator Henri Korman (centre) interviews Monsieur Spitals, managing director of A.E.C. Continental S.A., Antwerp, about British commercial vehicle highlights. With them on the London Transport Routemaster bus at the Earls Court show was Mr. H. E. Ells, publicity manager of A.E.C.

The Minister of Transport, after consultation with the Secretary of State for Scotland, has appointed the following to be members of the Scottish Transport Council until September 21, 1961: chairman—Lord Kilbrandon, Q.C.; members—Colonel D. H. Cameron of Lochiel, representing the British Transport Commission; Mr. Robert McKean, representing B.E.A.; Mr. I. P. R. Napier, representing David MacBrayne, Limited; Mr. Robert Taylor, representing the Scottish Advisory Council for Civil Aviation; Sir John Banks, representing the Transport Users' Consultative Committee for Scotland; Mr. W. Hughes and Mr. T. G. Robinson, who are independent members. Colonel Cameron and Mr. McKean are new members. The Scottish Transport Council was set up in February, 1956, to examine questions of common interest to the transport undertakings which are nationalised, controlled by a nationalised undertaking, or State-aided.

Daily door-to-door express container services in especially-designed container-ships to and from NORTHERN IRELAND

- All parts of Northern Ireland, Scotland and England served
- Greatly Minimised Risk of Loss by Theft or Damage
- Free Insurance (General Merchandise)—£800 per ton
- Closed Security-Locked Containers
- Insulated Containers for Perishable Foodstuffs—for Hygiene and Cleanliness
- Open Containers and "Flats" for Unpacked Machinery etc.
- All Goods Conveyed with Minimum Packing

Door-to-door inclusive rates

ANGLO-CONTINENTAL CONTAINER SERVICES (London) Ltd and (Belfast) Ltd

LONDON 79 Dunton Road SE 1 *Bermondsey 4881/4* (Head Office) and Elland Road SE 15 *New Cross 4885/7* (Traffic Depot) PRESTON The Docks *Preston 86742/4* LARNE (Northern Ireland) Bay Road *Larne 2331/2* BELFAST 35/39 Middlepath Street *Belfast 59261/5* MANCHESTER 2 270/1 Royal Exchange Buildings *Blackfriars 9287/9* GLASGOW 10 Bothwell Street C2 *City 6997/8* (Offices) and 17/21 Tylefield Street SE *Bridgeton 2277/8* (Traffic Depot) ARDROSSAN (Ayrshire) Harbour Street *Saltcoats 1911/2* BRISTOL 61 Park Street *Bristol 25435/6*

CLASSIFIED ADVERTISEMENTS

CLASSIFIED ADVERTISEMENTS should be addressed to THE MANAGER, Classified Advertisements, MODERN TRANSPORT, Russell Court, 3-16 Woburn Place, London, W.C.1.

SITUATION VACANT

MOTOR ENGINEER. A qualified Motor Engineer is required to act as Foreman in control of the maintenance of a fleet of lorries, private cars, tractors, cranes, etc. Must have administrative experience and be able to supervise a staff of chauffeurs and fitters.

Good progressive salary with first-class working conditions and equipment. Excellent staff pension. Five-day working week. Applications in writing only, with full details of qualifications and experience to Labour Manager, The Clayton Aniline Co., Limited, Clayton, Manchester, 11.

BUSINESS FOR SALE

MOTOR Carriers live business West Croydon: Vehicles and Premises for sale. Write Box No. 3845, MODERN TRANSPORT, 3-16 Woburn Place, London, W.C.1.

FOREIGN EMPLOYMENT

ROADMASTER

ENGINEERING graduate preferred; minimum of two years' engineering training essential.

Require two years' varied railroad engineering service, or five years in direct charge of track crews. Will supervise 135 men maintaining 45-mile railroad, assign work, order materials, be responsible for safety, make regular detailed inspections of roadbed and all track on main line, sidings and yards, bridges, tunnels, etc. Will make engineering calculations relating to maintenance and use of structure and equipment. Must speak Spanish. Married or single candidates acceptable.

Excellent opportunity large copper company, Chile, South America. Two-year contract with transportation both ways for you and family. Base salary $525.00 to $650.00 per month depending upon age and experience of applicant. Box No. 3846, MODERN TRANSPORT, 3-16 Woburn Place, W.C.1.

PICKFORDS HEAVY HAULAGE SERVICE
Abnormal Loads • Lifting
MOBILE CRANES FOR HIRE • Branches in all large towns

SILVER ROADWAYS LTD.
Reliable Trunk Services to all Parts

BRISTOL
8 The Grove, Bristol 1
BRISTOL 22315

BIRMINGHAM
323 High St., West Bromwich, Staffs.
WEST BROMWICH 2901

LLANELLY
Morfa Works, Llanelly
LLANELLY 4302

LONDON
22-24 Bermondsey Wall West, S.E.16
BERmondsey 4533

CARDIFF
10 Dumfries Place
CARDIFF 21631

SWANSEA
Exchange Buildings
SWANSEA 54171/5

GLASGOW
12 Dixon Street, C.2
CITY 3381

LIVERPOOL
11 Old Hall Street, Liverpool, 3
CENTRAL 6366

NOTTINGHAM
Pavilion Building, Pavilion Road, West Bridgford
NOTTINGHAM 83481

IMPORTANT CONTRACTS

Completion Order for Tube Stock

ORDERS have been placed by London Transport Executive for a further 619 cars to complete the rolling-stock renewal programme for the Central and Piccadilly lines. The orders, which are for car bodies and bogies only, are worth over £4 million. Deliveries will start in February, 1962, and will be completed by the end of 1963. Much of the equipment (motors, traction-control equipment and so on) for these cars has been on order since 1959, but further orders remain to be placed. Of the 619 cars concerned in the present order, 450 are to be built by the Birmingham Railway Carriage and Wagon Co., Limited (338 driving motor cars and 112 non-driving motor cars), and 169 (all trailer cars) by the Derby Works of British Railways, London Midland Region. The 589 cars of 1959 Tube stock being built by the Metropolitan-Cammell Carriage and Wagon Co., Limited, of which more than 150 are now running on the Piccadilly and Central lines, should all be in service by mid-1962 and deliveries against the present orders should enable the whole rolling-stock replacement programme for both lines to be completed by the end of 1963. The Birmingham Railway Carriage and Wagon Company built one of the three 1956 stock prototype trains on which the 1959 stock is modelled.

Caposite in "Oriana"

Caposite amosite asbestos, manufactured by the Cape Asbestos Co., Limited, has been used for the insulation of the engines, auxiliaries and all engine-room piping and surfaces of the P. and O.-Orient s.s. *Oriana*. Andersons Insulation Co., Limited, was the insulation contractor to Vickers-Armstrongs (Shipbuilders), Limited.

More Show Business

For the second time during the first week of the Commercial Motor Show the David Brown automobile gearbox division reported a big order from a vehicle builder; for 1,000 David Brown five-speed gearboxes for lorries of 12-14 tons gross weight, it follows a £90,000 order received on the first day of the show.

Traverser for Beyer Peacock

J. Gerrard and Sons, Limited, builder and contractor of Swinton, Lancs, has been awarded contracts for the construction of a traverser pit and for alterations to assembly shops at the Beyer Peacock locomotive works at Gorton. The project involves the construction of reinforced-concrete piled foundations to receive railway lines for a traverser unit by Cowans, Sheldon and Co., Limited, of Carlisle, which will be used for the movement of diesel-hydraulic locomotives between the various assembly stations. Nine openings, fitted with roller shutters, will be made in the existing walls to accommodate railway lines linking the production workshops and new assembly pits with multiple gauges constructed inside the shop.

Second Mnyusi—Ruvu Contract Awarded

A second contract has been awarded for the East African Railways and Harbours railway link between Mnyusi and Ruvu. This one is to East African Enterprises, Limited, for constructing earthworks and culverts starting at the southern end of the line about 2¼ miles west of Ruvu and ending about 10½ miles to the north. The joining of the Central and Tanga lines, which is planned to be in operation by mid-1962, means that, with the exception of the Southern Province Railway in Tanganyika, the whole East African Railway will be a complete unit.

Ten-thousandth Decca Marine Radar

Decca Radar, Limited, has announced the receipt of its 10,000th order for marine radar, which will be fitted in the Icelandic trawler *Lundinn VE 110*. Decca Radar entered the marine radar market in late 1949 and in the past 11 years has become established as the greatest marine radar company in the world, having already supplied equipment to approximately half the radar-fitted merchant ships of the world. The sale of 10,000 sets represents business of some £18 million, of which £11 million worth has been exported. Among the company's many important ventures was the introduction of the principle of the epoch-making true-motion radar in 1956.

Western Region Contracts

The Western Region of British Railways announces the following contracts:

Henry Williams, Limited, Watford, for signalling control and train describer panels at Port Talbot, Twyford and Newport East signalboxes.

Henry Williams, Limited, Watford, for signalling control panels at East Usk, Newport West, Maindee Main, Maindee North, Gaer Junction and Ebbw Junction signalboxes, Newport.

Lucas Furnaces, Limited, Birmingham, 7, for three gas-fired furnaces at Q shop, Swindon locomotive works.

Pelapone, Limited, Derby, for standby generating sets and transformers in signal relay rooms at Reading, Maidenhead and West Drayton.

The National Gas and Oil Engine Co., Limited, Ashton-under-Lyne, for standby generating set and transformers at Port Talbot signalbox.

Kyle, Stewart (Contractors), Limited, Wembley, for conversion of existing running and maintenance depot at Bristol Bath Road for diesel locomotives.

Jesshope, Limited, Stoke on Trent, for two portable rail movers at Shrewsbury Hookgate rail welding depot.

Good Business at the Show

Despite lower paid attendances at the recent Commercial Motor Show, reports from manufacturers indicate that excellent business was done during the 10 days and that future prospects are bright. A.E.C., Limited, reported that with two days still to go firm orders booked were 200 per cent up on the 1958 exhibition, representing a value of nearly £1½ million. Export orders alone taken by Leyland Motors, Limited, totalled over £2¼ million, including the three large orders reported last week, a single order having been placed by the Malayan Public Works Department for 170 Albion Chieftain Edbro-equipped tippers. Guy Motors, Limited, booked a single order worth £150,000 and Fodens, Limited, reported home-market business never previously equalled. British Motor Corporation, Ford Motor Company, Rootes Group and Vauxhall Motors all reported very successful results, Commer and Karrier sales during the first five days having been double those of the similar period in 1958.

SHIPPING AND SHIPBUILDING

Clyde Ready for Car Exports

SOME misgivings having been expressed about the ability of the Clyde to handle large numbers of cars exported from the new Scottish vehicle factories, the Clyde Navigation Trust has said that it is "quite prepared" to handle this traffic. The Rootes Group plans to export up to 75,000 cars a year from its forthcoming Linwood (Paisley) plant. The Trustees have already asked the stevedoring companies to look into preparations for the development of this traffic.

So far as shipping services are concerned Mr. G. M. Porrett, secretary of the Glasgow and Clyde Shipowners Association, said these would be provided if the traffic warranted the services. He pointed out that the expected 75,000 car exports a year could be handled by a little more than one car-carrying ship a week. This sort of service had been provided for the car manufacturers by the Lyle Shipping Co., Limited, although traffic had fallen away at present. No doubt that company would operate from Glasgow if there were sufficient inducement.

Tees Berthing Complaint

AFTER discussing complaints that the turn-round of ships in the Tees was being held up by the shortage of berths or labour shortages, or a combination of both, the Tees Conservancy Commission decided to ask its development committee to investigate the matter.

New Hope for Forth Port

THERE is a prospect that the Scottish port of Bo'ness, closed by the British Transport Commission about a year ago because of the decline in trade, may be acquired by a Canadian paper-making firm, which intends to construct a large factory in the vicinity. At least 50 acres would be required for the factory and Bo'ness is in a favourable position to supply this from reclaimed land.

Trio for Royal Mail Lines

RECENTLY Harland and Wolff, Limited, completed at its Belfast shipyard the R.M.S. *Arlanza*, a new passenger and cargo liner for Royal Mail Lines, and the vessel has been handed over to her owners on the successful completion of her sea trials. The *Arlanza* was the last of a group of three "A"-class vessels constructed by Harland and Wolff for Royal Mail Lines, the earlier vessels, *Amazon* and *Aragon*, having gone into service earlier this year. They have a gross tonnage of about 20,300.

Standard Ship Container Urged

SHIPOWNERS were urged to organise a world-wide pool of standardised shipping containers and to integrate their container service with other types of transport at a cargo handling exhibition and symposium of the International Cargo Handling Co-ordination Association in New York. Mr. Jerome Slater, vice-president of Container Transport International, Incorporated, said that such a pool would provide depots throughout the world and would handle the movement of containers beyond port areas, to provide the maximum utilisation and flexibility of equipment. Mr. Walter Isbrandtsen, vice-president of the Isbrandtsen Line, urged a standard container that could be used for ship, rail and road transport.

★

ENGINE COMPONENTS FACTORY

Development at Sunderland

PLANS for large-scale capital development at Sunderland have been announced by Hepworth and Grandage, Limited, Bradford. A twenty-two-acre site at Southwick has been purchased by the company and the first phase of factory construction will begin early in 1961. By the end of the year it is expected that the new plant will be far enough advanced to commence production of engine components with a labour force of 350. Most of these employees will be in semi-skilled categories and will be sought from the immediate locality of the works.

Subsequent stages of construction will develop the whole 22 acres. The new plant will ease the extreme pressure on the company's production capacity at its 26-acre main Bradford works, which is itself in process of being extended and modernised as far as the Distribution of Industries Act permits.

The Power Petroleum Co., Limited, has moved its north western division to new offices at 2-12 Cook Street, Liverpool. The new enlarged division, which was previously centred at Preston, incorporates part of the former Merseyside division, which had offices at Chester.

★

FINANCIAL RESULTS

NOTES on the trading results, dividends and financial provisions of companies associated with the transport industry are contained in this feature, together with details of share issues, acquisitions and company formations or reorganisations.

Gandy

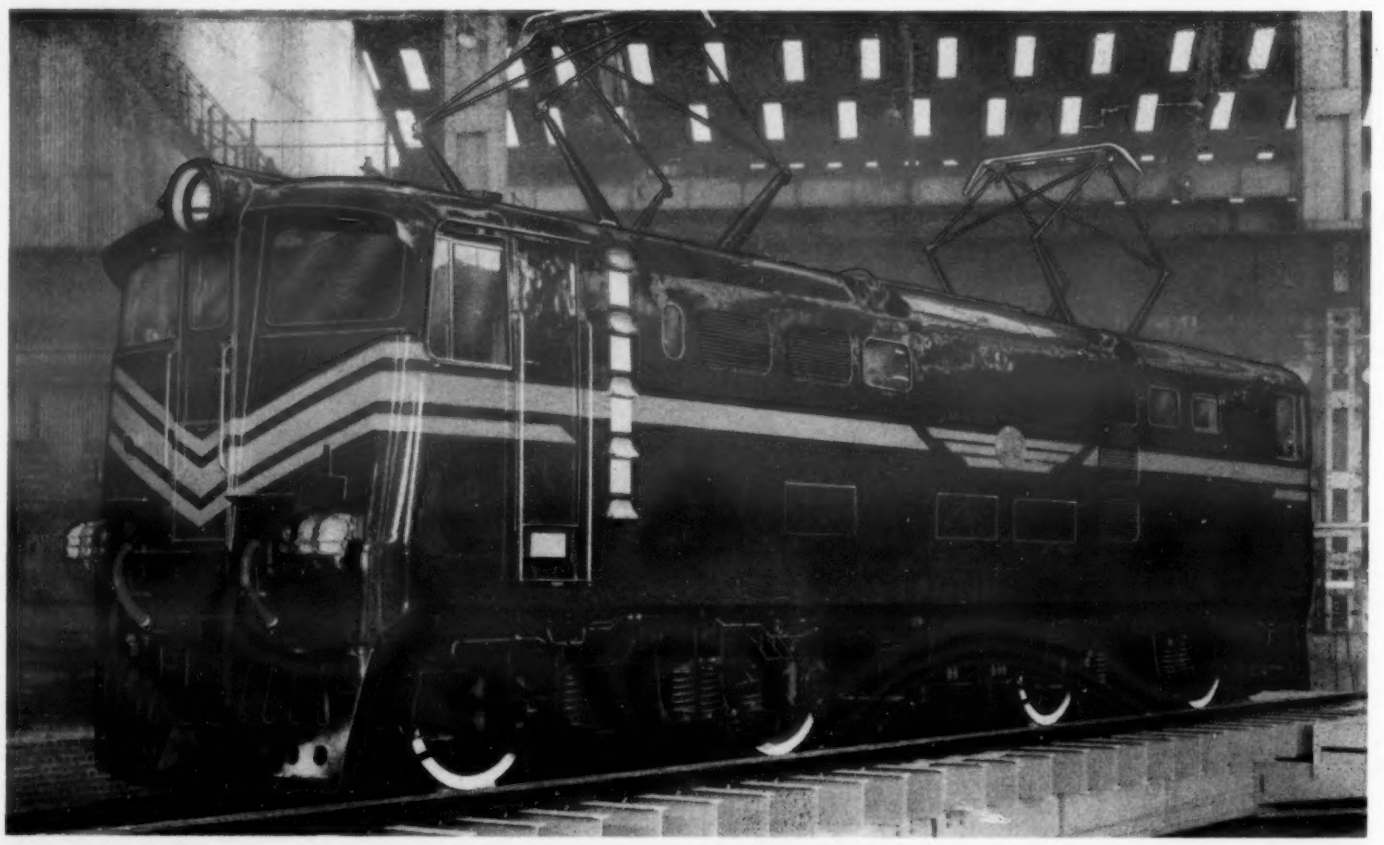
Group net profit of Gandy, Limited, for the 19 months ended July 31, 1960, was £26,432 (previous 12 months £4,957). Dividend is 8 per cent.

Atkinson Lorries (Holdings)

At the annual general meeting of Atkinson Lorries (Holdings), Limited, the chairman, Mr. W. G. Allen, stated that the order book was still full and that this should be reflected favourably in the accounts for the current year. The proceeds of the proposed rights issue will help support financially the increasing turnover, especially in the export market. Despite "almost suicidal competition," said Mr. Allen, he hoped to be able to present a much improved picture at the meeting next year. He forecast an unchanged dividend on the capital as increased by the rights issue, subject, of course, to unforeseen circumstances. The issue referred to is 2,000,000 2s. ordinary shares, offered to existing holders at 3s. 3d. on a two-for-three basis.

35 type 5.E.I. Electric Locomotives are being manufactured by Metro-Cammell for The South African Railways.

(Main Contractors A.E.I. Ltd.)



METRO-CAMMELL

ELECTRIC LOCOMOTIVES

FOR South African RAILWAYS

METROPOLITAN-CAMMELL CARRIAGE & WAGON CO. LTD.

HEAD OFFICE · SALTLEY · BIRMINGHAM 8 LONDON OFFICE · VICKERS HOUSE · BROADWAY · WESTMINSTER S.W.1

Printed by Odhams (Watford) Limited, St. Albans Road, Watford, Herts, for and published by Modern Transport Publishing Co., Limited, Russell Court, 3-16 Woburn Place, London, W.C.1.